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FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS



Projects on
FRUITS AND NUTS
Part 12

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled February 1958 by

the State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued August 1958

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FRUITS AND NUTS

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INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department (s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.

FRUITS AND NUTS

FRUITS (GENERAL)

Breeding

- Ind. Improvement of Tree Fruits and Small Fruits by Breeding for Disease Resistance, Quality, and Other Characters. To (1) search for and evaluate disease resistance and other desirable horticultural characters in tree fruit and small fruit species; (2) learn genetic basis for important pathogenicity and resistance factors in pathogens and hosts, and genetic bases for other desirable horticultural characters used in breeding programs; (3) examine chromosomal condition in breeding stocks and induce changes in numbers where necessary to effect improvement by interspecific hybridization and polyploid breeding; and, (4) breed commercially desirable tree and small fruit varieties through hybridization of desirable germ plasm.
Hort., Bot., Pl. Path. 960
- Ky. The Development of New Fruits Adapted to Kentucky. To develop fruit varieties adapted to Kentucky and superior in quality, food value, and resistance to disease.
Hort. 555
- La. Production, Breeding and Handling of Tree and Small Fruits with Particular Reference to Figs, Pears and Miscellaneous Fruits. To (1) assemble and evaluate existing varieties in Louisiana; and, (2) improve these varieties through breeding and test them on various markets for fresh and processed fruits.
Hort., Food Tech. 822
- Minn. Radiation as a Tool in Horticultural Crop Breeding. To (1) study mutagenic effectiveness of radiations upon several fruit and vegetable plants with respect to dosage, conditions, and time of radiation, and in relation to periods of growth, dormancy, and rest periods of plants and seeds; (2) study effects of radiations on subsequent development of plants and seeds; and, (3) produce mutations useful to fruit and vegetable breeders.
Hort. 2127

- N. H. Breeding Improved Fruits for New Hampshire. Develop improved varieties of fruit, including: (1) hardier peaches; (2) later ripening apples, and provide a suitable mate for McIntosh with greater hardiness and more disease resistance; (3) better raspberries and blackberries; (4) late pear variety equal to Clapp's Favorite with more winter hardiness and blight resistance; and, (5) later ripening strawberries of superior quality.
Hort., Bot. 74
- N. Y. Cytological and Genetical Problems Involved in the Production of Improved Forms of Fruit and Other Horticultural Plants. To gain a clearer insight into cytological, genetic and anatomic mechanisms in production of improved forms of horticultural plants, with special reference to polyploid forms.
Pomol. 13
- S. Dak. Breeding Tree Fruits for South Dakota. To develop varieties of such fruits as apples, pears, apricots, plums, and cherries of improved quality and adapted to South Dakota conditions.
Hort. 1-R
- Varieties
- Alaska Improving Alaska's Fruit Industry. Foster development of fruit crops by devising improved cultural and handling practices, and by making available better varieties of vine, bush, and tree fruits.
Hort., Ent., Plant Path., Soil Sci. 11
- Idaho Variety Testing of Fruits and Vegetables. To (1) test varieties of fruits and vegetables for adaptability to Idaho; (2) test yielding ability under Idaho conditions; (3) observe and note quality of fruits and vegetables, making organoleptic tests and other suitable tests; and, (4) continue selections from existing seedling populations of apples and cherries originated at this station.
Hort. 219
- Nebr. The Improvement of Ornamentals and Fruits for Nebraska Through Selection, Breeding and Cultural Practices. To (1) select and develop varieties of ornamentals and fruits of possible value in Nebraska; (2) test such selections in cooperation with Great Plains Nurserymen, Garden Clubs and other interested Experiment Stations; (3) provide information and materials for educational programs conducted by Extension Service; and, (4) coordinate research by facilitating exchange of ideas and materials between workers, and by making all work done throughout the state parts of a single plan rather than several separate investigations unrelated to each other.
Hort. 461 (NC-7)

- N. H. Variety Tests of Fruits and Vegetables. To test and eventually make recommendations concerning new varieties of fruits and vegetables as they are introduced, particularly those which seem to have promise in this area in comparison with standard varieties.
Hort. 37
- S. Dak. The Collecting, Preserving, Cataloging, Propagating, and Testing of Fruit Plants Having Potential Genetic Value. To catalogue all fruit plants used in the fruit breeding project. This will include plant introductions as well as local selections. Propagate a limited number of such plants to be made available to other experiment stations. Test the plants for adaptability, quality, genetic value, disease resistance and any similar characteristics. To cooperate with stations of other regions in the collection and testing of materials to be used in the N. C. Region.
Hort. 174 (NC-7)
- Tenn. Fruit Variety Investigations. To (1) evaluate varieties for potential yield and market value; and, (2) learn performance of varieties with respect to climatic adaptability.
Hort. 127
- Wyo. Testing Kinds and Varieties of Vegetables and Fruit in Wyoming. To (1) find disease resistant varieties of vegetables and fruits which will grow and produce high quality marketable yields in areas of different altitudes in Wyoming; (2) test and evaluate new kinds and varieties of vegetables and fruits grown at a high elevation for adaptability, freezing and dehydro-freezing qualities; and, (3) determine factors affecting quality and nutritive properties of processed vegetables.
Agron., Home Econ., Chem. 542
- Culture
- Alaska Weed Control of Horticultural Crops. To determine which chemicals and cultural practices or combination thereof are best suited to control of weeds and their influence on productivity, winter survival, and quality of such crops as lettuce, cabbage, beets and strawberries.
Hort. 9
- Calif. Studies in Orchard Soil Fertility. Points to be investigated include: (1) soil management practices such as (a) cover-crop block, under differential treatment for 25 years, (b) pear block for data on cultivation vs. non-leguminous sod, and (c) "non-cultivation" plots now under way as cooperative trials in commercial orchards; (2) use of commercial fertilizers to provide suitable nutritional conditions; and, (3) adaptation of means of evaluating effect of treatment on soil structure.
Pomol. 768

- Calif. I. Composition, Behavior, and Fertilizer Responses of Different Species of Fruit Trees Growing in the Orchard in Soils Low in Potassium and Phosphorus. II. The Relationship of Sodium and Other Elements to the Potassium Nutrition and Growth of Fruit Trees in Orchard Soils. To study (1) the response of prune and other fruit trees on low potassium soils to applications of potassium; (2) the response and behavior of almond, apricot, apple, cherry, peach, pear, prune, walnut, and filbert trees growing in the orchard in soil low in phosphorus to applications of phosphorus.
Pomol. 991
- Calif. Physiological Effects on Fruit Plants of Chemicals Other Than Fertilizers. To learn (1) nature of injury and conditions under which it occurs from the use of a suspected chemical on fruit plants; (2) long-term effects of a suspected chemical on fruit plants; and, (3) if there are conditions under which a suspected chemical may be safely used.
Pomol. 1704
- Storrs
(Conn.) Plant Tissue Analysis as a Measure of Nutritional Status of Fruit Trees. To (1) note seasonal trend in soluble nutrient content of apple leaves; (2) note effect of tree position of leaves on seasonal trend; (3) a mass data by state-wide leaf analysis survey to indicate general nutritional levels of apple orchards; (4) note if nutritional level of apple trees varies by tree age and variety; and, (5) investigate relations of soil fertility to tissue composition.
Pl. Sci. 183
- Del. Factors in Nutrient Disturbances in Fruit Crops. To (1) correlate growth, productivity, and chemical composition of leaf samples, with kind and amount of NPK fertilizers applied in an apple orchard; and, (2) study those fertilizing methods and materials which may lead to an improvement in general nutritive level of Delaware fruit plantings.
Hort. 49-H
- Idaho The Water Requirements of Tree Fruits. To (1) develop a practical technique for determining the point of critical water deficit in fruit tree tissues; and, (2) measure effects of acute water deficits on growth of trees and fruit.
Hort. 209
- Idaho Nutrition of Fruit Trees in Idaho. Learn nutritional needs and work out effective and efficient means of supplying major and minor nutrients. Develop improved techniques for diagnosing nutritional deficiencies.
Pl. Physiol., Hort. 269

- Ill. Moisture Utilization by Fruit Crops. To learn effect of (1) supply of available soil moisture upon vegetative and reproductive responses of fruit plants; (2) fruit production practices upon efficiency of utilization of soil moisture supply; and, (3) environmental factors upon soil moisture supply as related to fruit production.
Hort. 65-311
- Ill. Nutritional Studies on Orchard and Small Fruit Crops. To evaluate relationship between fertilizer practices and soil characteristics and those fruit plant responses which influence fruit yield and quality under Illinois growing conditions.
Hort. 65-314
- Ind. The Investigation of Stock and Scion Problems of Tree Fruits. To (1) select improved rootstocks for fruit trees which are suited to use under Indiana conditions, with emphasis on hardiness and dwarfing; (2) study cultural problems which new stocks present when grown in combination with various scion varieties; and, (3) study physiology of stock and scion combinations in order to facilitate selection of superior stocks and accentuate desirable characters.
Hort. 747
- Ind. The Effect of Different Systems of Soil Management and Fertilization Upon the Growth and Productivity of Fruit Trees. (1) Learn what methods can be used to improve physical condition of soils to be used as orchards; (2) study methods of counteracting ill effects of necessary orchard management practices on soil structure; (3) learn what effects created high levels of soil fertility may have on growth and fruitfulness of trees; and, (4) develop a working correlation between plant composition and analysis of soil and fertilizer application.
Hort. 946
- Kans. The Relationship Between the Use of Some Chemical Compounds and Cultural Practices on the Vegetative Response and Fruitfulness of Fruit Plants. To determine influence of various chemical compounds used as insecticides, fungicides, herbicides, growth regulators, or fertilizers on the photosynthetic activity, blossom bud formation, fruit production or vegetative characteristics of fruit plants.
Hort. 265
- Maine The Effect of Pesticides on Quality of Fruits and Vegetables. To (1) evaluate some sensory techniques commonly used to learn quality of fruits and vegetables; and, (2) learn effect of some pesticides on quality of selected fruits and vegetables.
Hort., Ent., Pl. Path. 28 Coop. ARS. (NE-15. See Part 7, section d)

Md. Chemical Thinning of Apples and Peaches. To (1) learn response of heavy-fruiting major varieties of apples to post-bloom chemical thinning sprays and margins of safety for each variety; (2) study effects of time of application and concentration of chemicals on thinning of apples and peaches by means of post-bloom sprays; (3) develop satisfactory method of chemical thinning of peaches in post-bloom period; and, (4) learn possibilities of reducing biennial bearing of major apple varieties by chemical thinning.

Hort. L-74-B

Md. The Mineral Levels and Interrelationships of Mineral Nutrients in Fruit Plantings in Maryland. To learn (1) growth and fruiting response of apple trees to levels of K in range above that of obvious deficiency; (2) effects of mulching systems on mineral nutrition of apple and peach trees; and, (3) causal factors of a physiological disorder in apple known as "internal bark necrosis", and to effect controls for the condition.

Hort. Q-79-b

Mass. Effect of Pesticides on Quality of Fruits and Vegetables. To (1) develop effective methods for detecting differences in flavor which may be caused by pesticides applied to fruits and vegetables before harvest; (2) learn if flavor differences are due to pesticides per se, to decomposition products of pesticides, or changes in food product itself caused by physiological response of plant to the chemical; (3) correlate pesticide or decomposition product residuals with organoleptic analyses; and, (4) learn taste threshold values of pesticides and/or their decomposition products.

Food Tech. 71 (NE-15. See Part 7, section d)

Mass. Influence of Chemical Treatments on Flowering and Fruit-
ing of Fruit Trees. Improve the size, color and quality of fruit on heavily bearing fruit varieties by the use of chemical thinning materials. Prevent wide fluctuations in the productivity of fruit trees, especially apple varieties, which have a tendency to bear heavily in one year and be practically barren the following year, by the use of chemical thinning techniques. Reduce the hazard of spring frost damage, which may not only reduce or eliminate the current year's crop but also may tend to make even generally annual bearing apple varieties alternate for several years, thereafter, by delaying the time of blossoming with some chemical or other treatment. Improve the set on fruit varieties, which because of climatic conditions or lack of pollenizers fail to set full crops, by the use of hormone materials or improved methods of pollen dissemination.

Hort. 95

- Mich. Frost Control on Vegetation by Convected Heat, Infra-red Radiation and by Sprinkler Application of Water. To (1) investigate all possibilities of generating infra-red which would be adaptable to frost control, and develop methods and equipment entailing lowest manufacturing costs, using liquid fuels, and using LP gas; and, (2) investigate possibility of using helicopter rotor as a method of bringing warm upper air down on the crop, with added heat.
Agr. Engin. 6-A
- Mich. Development and Standardization of Methods of Determining Nutritional Requirements of Fruit Crops. To establish reliability of plant analysis as a method of learning nutritional needs of fruit crops.
Hort. 54
- Mich. The Interrelation of Environment (Temperature and Relative Humidity) and Spray Chemicals on Russetting, Lustre, Color and Ripening of Apple Fruits and on Physiology of Apple Leaves. To determine (1) environmental conditions and time during flower and fruit development that fruit russetting is most likely to occur from use of chemicals; (2) if injury to epidermal cells of flower and fruit is necessary for occurrence of russetting by pesticide chemicals; (3) relation between apple varieties and injury from various chemicals as influenced by temperature and humidity; and, (4) interrelation of plant regulators used to control pre-harvest fruit drop and night and day temperature on rate of fruit ripening.
Hort. 116
- Minn. The Nutritive Value and Quality as Determined by Objective Tests of Frozen Fruits and Vegetables. To study (1) the ascorbic acid and dehydro-ascorbic acid changes caused in fruits and vegetables by methods of preparation for freezing and freezing-storage being recommended by the station; (2) color, texture, and any other quality factors possible by objective tests in fruits and vegetables frozen and stored by the methods referred to in (1); and, (3) to use measurements in (1) and (2) as guides in working out better methods for the freezing and freezing-storage of fruits and vegetables.
Home Econ. 2011

Minn.

Physiological Studies of Fruit Crops as Related to Growth and Development. To (1) study fruit plants to learn their ability to resist low temperatures, the relationship of plant structure and physiological behavior to cold resistance, and effects of environmental or cultural factors upon survival; (2) screen new growth regulating chemicals for use in certain applicable phases of tree and small fruit production, test new or additional uses for these materials in fruit plantings, and to undertake basic physiological studies to learn mode of physiological action of the chemicals; (3) study response of fruit plants to photoperiod under controlled length of day conditions; and, (4) make survey to learn general nutrient level of fruit plants in major producing areas of the state, and make mineral analyses of plant tissues to be correlated with appropriate plant responses.

Hort. 2124

Mo.

Nutrition of Fruit Plants. To (1) study correlations between available essential nutrient element content of soil, content of elements in plant tissues and performance of crop plant in established plantings for major fruit growing regions; (2) learn optimum levels of major and minor nutritive elements for fruit plants under State conditions; (3) learn most practical methods for indicating nutritive needs of plants; (4) develop more satisfactory methods of applying nutrients to plants; (5) study relation between certain physical properties of soil and availability of mineral elements to fruit plants; and, (6) study absorption and use of nutrients by plants during high and low levels of available moisture.

Hort. 4

N. H.

Temperature Relations in Horticultural Plants Under New Hampshire Conditions. To learn effect of (1) various pigments, paints, and metal reflectors on winter hardiness of fruit trees; (2) mulches on soil temperature around roots of horticultural plants; (3) uniformly low temperature on winter hardiness of such plants; (4) to learn importance of obtaining temperature records on favorable sites; and, (5) maintain a base station for recording climatological data.

Hort. 40

N. H.

Nutritional Studies with Horticultural Plants. To (1) determine causes and prevention of leaf scorch; (2) study effect of animal manures on leaf scorch and nutrition, and of (3) organic compounds of mineral nutrients as compared with inorganic forms on leaf scorch and plant response in general; (4) determine factors causing mineral deficiencies; and, (5) effect of mulches on mineral nutrition.

Hort., Agr. Chem., Biochem., Bot. 41

- N. H. Relation of Honeybee to Horticultural Crops in New Hampshire. To learn (1) effect of colony population and location on distribution of foraging honeybees; and, (2) pollination requirements for Low-Bush blueberries and apples in New Hampshire.
Ent. 114
- N. Y. A Study of the Soil Factors Associated with Significant Differences in Yield and Behavior of Important Fruit Crops. To determine the less obvious soil factors associated with significant differences in the yields of important fruit crops grown in the commercial fruit areas of the State.
(Cornell) Agr. Econ., Agron., Pomol., Bot., Pl. Path. 137
- N. Y. Leaf and Soil Analyses in the Diagnosis of Fertilizer Problems of Fruit Plants. Make a critical evaluation of chemical analyses of leaf and soil samples as a basis for diagnosis, and prediction of fertilizer needs of individual fruit plantings of New York.
(Cornell) Pomol. 194
- N. Y. Hormone Induced Responses in Fruit Plants with Special Reference to Flower Bud Formation and Rest Period Phenomena. To reveal nature of internal condition responsible for initiation of flower buds and provide means to control flower bud production (ultimate aim); or, more specifically, to determine (1) effect of certain hormone-like substances in hastening or delaying onset of bearing in young trees; and, (2) if flower-forming hormone is responsible for converting buds from a vegetative to a flowering condition.
Pomol. 10-A
- N. Y. Mineral Nutrition of Fruit Plants at Various Stages in Their Development. To learn (1) effect of major mineral supplements on growth, fruiting habits, and fruit quality when applied or withheld at different stages of development of the fruit plant; and, (2) significance of interaction between certain nutrients (N:K, K:Mg) with respect to fruiting habits and fruit quality.
Pomol. 36

N. C.

Weed Control in Corn, Sorghum, Tobacco, Small Grain, Horticultural Crops, and the Specific Control of Bermuda Grass and Wild Garlic. To develop (1) field production practices to better control weeds in corn, sorghum, tobacco, small grain, and horticultural crops, and better control methods for Bermuda grass and wild garlic; and, (2) basic principles and practices involved in satisfactory farm use of above methods, to learn facts needed to understand failures if and when they occur, and methods of preventing such failures.

Field Crops H-59

Ohio

Causes of Abscission of Flowers and Young Fruits Following Applications of Synthetic Hormones and the Relation of Naturally occurring Hormones to Such Abscission. To (1) determine causes of abscission of flowers and fruits resulting from application of synthetic hormones applied during bloom and subsequent fruit setting period; (2) measure variation in naturally occurring hormone content of developing and abscissing young fruits of several apple varieties to relate if possible such differences as may be found to particular fruit setting behavior of the variety; (3) measure effect of applications of synthetic hormones on natural hormone content of developing fruits; and, (4) study effect of applications of synthetic hormones on anatomical and cytological behavior of developing ovules, embryo sacs, embryo and endosperm.

Hort. 4

Ohio

Nitrogen and Mineral Nutrition of Tree Fruits. To (1) learn influence of differential nitrogen fertilization on the absorption and accumulation of mineral elements and on the growth, yield, and fruit quality of mature bearing apple trees; (2) learn influence of different rates and combinations of N, P, and K fertilizers on the growth, chemical composition, and productivity of newly established apple orchards; (3) learn effect of soil and spray applications of K and Mg on growth, chemical composition, and productivity of a young orchard established on site previously shown to produce foliage containing less than established critical levels for these elements; and, (4) attempt to further refine nutritional needs of tree fruits with respect to macro- and micro-nutrient elements by means of foliar analysis and correlation with growth, yield, and quality of the fresh product.

Hort. 69

Oreg.

Nutrition of Tree Fruit Crops in the Rogue Valley Area.

To (1) learn nutritional status of tree fruit crops grown in Rogue Valley; (2) learn most effective and economical source of any fertilizer nutrient found lacking in orchards; (3) learn best time and method of placement of fertilizers; (4) learn effects of soil applied nutrients upon soil physical and chemical conditions and effects of a soil or foliar applied nutrient upon uptake and utilization of other nutrient elements; (5) evaluate effects of fertilizers on storage life, superficial and ground color, flavor, texture, etc.; (6) learn N and mineral nutrient requirements for fruits; and, (7) correlate plant and soil composition in development of diagnostic and prognostic procedures.

Hort. 276 Coop. ARS

Oreg.

Nutrition of Tree Fruit Crops in the Mid-Columbia Area.

To (1) learn nutritional status of orchards; (2) Learn N and mineral nutrient needs for various fruits grown in area; (3) learn amounts of fertilizers needed to maintain orchards at or above critical nutrient level; (4) learn effects of climate on use of plant nutrients and on tree response to applied fertilizers; (5) learn effect of fertilizers upon uptake and use of nutrient elements with special reference to tree response in growth and productivity; (6) correlate plant and soil composition in development of possible diagnostic and prognostic procedure; (7) evaluate effects of nutrients and of added fertilizer on storage life, superficial and ground color, flavor, texture, firmness and size; and, (8) develop techniques and catalog information for differentiating between symptoms of mineral deficiencies or excesses and symptoms or expressions of plant viruses, with special reference to stone fruit.

Hort. 277

Pa.

The Use of Surveys to Determine "Optimum Values" of Nutrient-Element Leaf Concentrations. To determine leaf concentrations of various essential elements in major horticultural crops which are associated with desired responses as affected by fertilization, soil, and climatic conditions.

Hort. 874-A

Pa.

Nutrient-Element Deficiencies in Horticultural Crops.

To study (1) use of leaf analyses in confirming visual diagnosis; and, (2) value of various nutrient-containing materials in correcting these symptoms when applied to soil or as foliage sprays.

Hort. 874-B

- Pa. A Study of Leaf Analysis Techniques. To (1) study methods of improving the techniques involved in sampling and preparing leaf samples for analysis; and, (2) develop improved analytical procedures for leaf analysis.
Hort. 874-C
- Pa. The Application of Climatology to Pennsylvania Fruit Culture. Conduct experiments on development, production, and quality of apples, peaches, cherries, and grapes under controlled climatic conditions in the field.
Hort. 1294-B (NE-35. See Part 15)
- Tenn. Mineral Nutrition of Fruit Crops. To (1) determine place of various minerals in fruit production in state in order to increase fruit yields and improve fruit quality; (2) relate fertility levels to seasonal plant response, particularly with reference to winter hardiness; and, (3) determine influence of minerals on behavior of fruit crops under cover crops and behavior of cover crops.
Hort. 125
- Tenn. Propagation of Fruit and Ornamental Plants. Investigate the effects of maturity of tissues, supplementary nutrients, length of photo period and intensity of light in propagation of difficult species; Rosaceae, especially Rubus, Pyrus, and Malus; Aquifoliaceae, Ilex; Berberidaceae, Mahonia, Nandina and Berberis; Ericaceae, Rhododendron; Oleaceae, Osmanthus.
Hort. 128
- Utah Orchard Rootstocks Investigations. To secure better adapted, hardier, higher yielding, longer lived, earlier bearing, disease and insect resistant root stocks for orchard fruits for Utah conditions.
Hort. 339
- W. Va. Effects of Herbicides on Tree Fruits and Small Fruits. To determine whether herbicides that are recommended for weed control in orchards and small fruit plantings can be (1) safely used yearly (or more frequently, if specified by recommendations) for several seasons; and (2) whether orchardist or home owner is likely to suffer injury to his plants or fruit if excessive rates are applied.
Hort. 116
- Wis. The Quality of Fresh and Processed Fruit as Affected by Orchard Sprays. To (1) determine effects of spray chemicals used in apple and cherry orchards on color, finish, texture, firmness, taste, and storage life of fresh and processed fruit; and, (2) relate findings to preferences or needs of consumers and processors.
Dairy & Food Indus., Ent., Pl. Path. 952

Harvesting and Storage

- Calif. The Physiology of Abscission in Horticultural Plants.
To (1) learn environmental and internal factors affecting auxin gradient at abscission zone; and (2) study associated morphological phenomena.
Bot. 1357
- Calif. Development of Mechanical Harvesting and Field Handling of Deciduous Tree Fruits, Nuts, Grapes, Olives, Berries, and Vegetables. To (1) reduce labor requirements and unit costs of harvesting tree and vine crops through design and development of mechanical equipment and improved handling techniques; and, (2) maintain quality of final product under a revised harvesting system.
Agr. Engin. 1551
- Mass. Refrigerated Fruit Storage. To study operation of refrigerated and modified atmosphere apple and cranberry storages in Massachusetts so that design conditions based on fundamentals can be established for these types of refrigerated fruit storages in Massachusetts.
Agr. Engin. 52
- Mich. Post-Harvest Physical and Chemical Changes in Fruits and Vegetables in Relation to Quality. I. Pre-Harvest Treatment, Harvesting and Curing Practices on Storage and Market Quality of Onions. II. Nature, Measurement and Control of Substances Causing Bitterness in Carrots, Celery, and Lettuce. III. Enzyme Relationships and Biochemical Changes Associated with the Rapid Post-Harvest Deterioration of Strawberries, Muskmelons, Peaches and Asparagus. I. To ascertain effects of maturity, pre-harvest chemical treatments, topping methods, and curing temperatures on such quality factors as firmness, water loss and dry matter content of onion bulbs and on the color, thickness, and tightness of the outer scales; II. To learn chemical constitution of principle or compound causing bitterness and devise methods for its deterioration, and measure quantitatively the effect of various handling and storage treatments on occurrence, development or disappearance; and, III. To learn nature of enzymatic and biochemical changes associated with flesh softening of strawberries, and peaches, internal breakdown of muskmelons and darkening and subsequent breakdown of stored or packaged asparagus; and evaluate physical and chemical treatments to retard these disorders.
Hort. 68

Minn.

Handling, Processing, Packaging, and Storing of Fruits, Vegetables, and Other Food Products. 1. Processing, Packaging, Freezing, and Storing of Fruits, Vegetables, and Other Foods for Preservation by Freezing. 2. Varietal Adaptability of Fruits and Vegetables for Processing. 3. Handling, Packaging, Transporting and Storing of Fresh Fruits and Vegetables. To (1) obtain information of value to commercial processors, owners of frozen food locker plants, and to home processors; (2) assist Horticulture Department in selecting new varieties of fruits and vegetables for naming and introduction; (3) study post-harvest handling, packaging, and storage of fresh fruits and vegetables, including seedling selections.

Hort. 2103

Minn.

Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage. 4. Fruits. To determine: (1) microorganisms or factors responsible for fruit deterioration; (2) main factors governing development of deterioration and nature of deterioration; and, (3) chemicals or control methods.

Pl. Path., Bot. 2220-4

N. Y.

(Cornell) A Study of Some Cultural, Harvesting, and Handling Problems in Fruit Production; To Improve or Develop Equipment and Methods of Use to Reduce Labor and Fruit Losses. To (1) find ways to reduce labor costs and fruit damage during picking, handling and transporting to storage and handling in processing plants; (2) make improvements on, or development of an apple grader-sizer to reduce bruising; (3) improve packaging methods, packing house layout and equipment to reduce labor and fruit injury, thus putting an inexpensive packaged product on market; (4) develop suitable brush removal equipment to dispose of prunings; and, (5) learn best pruning methods, and improve or develop equipment: Hand or power pruners, or a combination of both; use of ladders, pruning platforms or mechanical towers; combine a pruning and harvesting machine for grapes.

Agr. Engin. 205

Ohio

Respiration and Associated Factors as Indices in the Determination of the Period of Marketability (Shelf Life) of Fresh (Unprocessed) Fruits and Vegetables. To determine (1) the rate of respiration and weight loss of fresh fruits and vegetables under the conditions normally encountered in retail and wholesale distribution; (2) optimum conditions for storing and handling fresh fruits and vegetables through the study of various packages and controlled temperature and humidity ranges; (3) maximum holding period for fruits and vegetables under various controlled conditions; (4) through chemical analysis the changes which occur in fresh fruits and vegetables during the holding period in relation to reducing sugars, total sugars, fiber, or other measurable material changes; and, (5) effect of the source of fresh fruits and vegetables (information on growing environment and early post-harvest handling) on the respiration rate and quality of these fresh fruits and vegetables.

Hort., Agr. Econ. 60

R. I.

Certain Factors Influencing Keeping Quality of Tree Fruits in Storage. To determine (1) effect of initial carbon dioxide treatment of fruits on subsequent storage behavior; (2) relationship between vapor pressure deficit of the air and transpiration rate of apples as affected by various treatments; (3) relationship between cutin and scald development, respiration, and transpiration of apples; and, (4) effectiveness of various pre- and post-storage treatments on scald development and keeping quality.

Hort. 501 Coop. AMS

Wash.

Harvesting and Handling Freestone Peaches to Improve Uniformity and Quality for Canning. To (1) learn source and extent of handling damage to freestone peaches destined for processing; (2) reduce amount of handling damage; and, (3) provide fruit of more uniform maturity for canning through improvement of harvesting and handling methods.

Hort. 1294

Processing and Utilization

Calif.

Economic and Engineering Studies of Packing House Practices. Economic studies will include labor input incentive systems, time and motion studies, and such other investigations as may be needed to improve work efficiency, working conditions, and physical efforts of employees. Engineering studies will include analysis of the flow of materials through the packing house and storage rooms, fruit handling equipment, disposal of products, by-products and wastes, efficiency of mechanical equipment, and analysis of operations which may lead to equipment improvement, labor reduction, and lower operating costs.

Agr. Econ., Agr. Engin. 1331

Calif.

Costs and Efficiency with New Methods of Packaging and Handling Deciduous Fruits in California. To (1) estimate impact of new containers and methods of packaging on costs and efficiency in packing and shipping operations for deciduous fruits; and, (2) indicate cost reduction possibilities through use of new methods for handling deciduous fruits in orchard and packing-house operations.

Agr. Econ., Agr. Engin., Pomol. 1573 (WM-19. See Part 14, Section b)

Del.

Chemical Changes that Occur in the Pectins of Fruits and Vegetables in "Fresh Market" Channels. To (1) establish chemical changes which occur from time fruits and vegetables are harvested until sold; (2) establish a physico-chemical basis for the changes in quality which occur during marketing; and, (3) develop practical measurements and means of preserving quality in fruits and vegetables following harvest.

Chem. 27-C

Ga.

Improving Present Practices of Freezing Fruits, Vegetables and Meats. To study (1) varieties of fruits, vegetables, and meats suited for freezing in locker plants and home units; (2) use of anti-browning agents and anti-oxidants-citric acid, ascorbic acid, sulphuric acid and others to extend storage life of frozen products; (3) type and methods of packaging to prevent desiccation, oxidation and flavor loss; and, (4) better means to sweeten frozen fruits for optimum flavor, color, and texture, by using combinations of sucrose, dextrose and corn syrups.

Food Proc. 72

Kans.

Effects of Varieties and Certain Treatments on Quality of Fruits and Vegetables Preserved by Freezing. Learn (1) suitability of new varieties of fruits and vegetables for freezing, and compare their desirability with well established varieties; (2) effects of pre-freezing treatments with solutions of Ca salts and/or other materials found to be suitable for use with fruits and vegetables; and, (3) effect of freezing techniques on texture of product.

Hort., Home Econ. 233

Maine

Effect of Pesticides on Quality of Fruits and Vegetables. To learn by sensory techniques the effects of some pesticides on quality (Particularly flavor) of selected Maine-grown fruits and vegetables, and evaluate and improve organoleptic methods for learning quality (flavor, texture, color, odor) of fruits and vegetables.

Hort., Ent., Plant Path. 28 (NE-15. See Part 7, Section d)

- Mass. Processing and Utilizing McIntosh Apples and Cranberries.
(1) Learn nitrogenous constituents and thiamine content of McIntosh and other varieties in relation to efficient conversion of apple carbohydrate to ethanol in preparation of vinegar stock. Effort will be made to identify specific deficient constituents and to devise practical methods of correcting same. (2) Application of Hunter Colormeter to grade cranberries and cranberry products will be investigated. Influence of environmental conditions in various bogs on development of red pigment of fresh fruit will be studied. Work on quinic acid content of fruit will be completed, and a search will be made for unknown acids in cranberry by application of chromatography.
Food Tech. 69
- Mich. Irradiation of Fruits and Vegetables. (1) Learn effectiveness of ionizing radiations in extending shelf and storage life of fruits and vegetables. (2) Study undesirable changes in color, texture, and flavor occurring in fruits and vegetables as a result of irradiation. (3) Learn effects of irradiation on metabolic activities of fruit and vegetable tissues.
Hort. 845
- Minn. Nutritive Value, Quality, and Utilization of Minnesota Fruits and Vegetables. I. A Study of the Changes in Nutritive Value and Quality Which Take Place in Fruits and Vegetables During Home Cooking. II. Testing the Quality of Minnesota Fruits for Culinary Uses. I. To determine (1) the effect of different methods of home cooking (boiling, steaming, pressure sauce pan) on C, Ca and P content of two varieties each of cabbage, green beans, sweet corn and squash, and of rutabagas; and on color of cabbage and green beans; and, (2) the effect of methods of preparing for cooking (shredding and cutting in different ways) on same nutrients in cabbage, green beans, and carrots from market sources; and on color of cabbage; and (3) to work out details for determination (in 1943) of riboflavin, thiamin and iron. II. To continue quality tests of Minnesota fruits.
Home Econ. 2004
- Mo. Pesticides for Disease Control and Their Effect on Fruit Finish in Apples. To (1) test several antibiotics in two concentrations and in different formulations for control of fire blight on apples and pears; (2) determine effectiveness of zineb and captan against cedar rust; (3) determine value of lead arsenate in control of sooty blotch and extent to which disease can be controlled by beginning spray applications after disease shows; (4) determine compatibility of phenyl mercury-protective fungicide combinations from standpoint of spray injury and control of apple scab; and, (5) determine effect of several more efficient fungicides on fruit finish of apples with the view of developing safe spray programs which are efficient and economical.
Hort. 232

N. J.

Pilot Scale Precooling Studies with Certain Fresh Fruits and Vegetables and Shipping Quality Characteristics of New Jersey Blueberry Varieties. Evaluate (1) hydro-cooling (with new test chemicals) on quality maintenance of strawberries, lettuce, peaches and snapbeans under controlled lab conditions; (2) vacuum cooling on quality maintenance of lettuce and other produce under controlled lab conditions; (3) study economic feasibility of vacuum cooling and hydro-cooling under State conditions. Evaluate (4) shipping quality characteristics of blueberry varieties under controlled lab conditions and in test shipments to distant markets; and, (5) air blast cooling process on quality maintenance of berries under controlled pilot scale operations.

Agr. Econ., Food Tech., Plant Path. 28

Ohio

Development of Methods for Evaluating Quality of Fresh and Processed Fruits and Vegetables. To (1) develop new methods for quality evaluation of fresh and processed fruits and vegetables, using both subjective and objective techniques; and, (2) compare quality evaluations secured by newly developed procedures with those from commonly employed techniques.

Hort. 29

Ohio

Comparison of Fruits and Vegetables Processed by Radiation Sterilization with the Same Fruits and Vegetables by Canning and Freezing. (1) Evaluate nutritional and quality differences of fruits and vegetables processed by means of radiation sterilization when compared to same items processed by canning and freezing. Study effects of radiation sterilization on nutritional and quality differences of: (2) several varieties known to differ in their adaptability for canning and/or freezing, for each commodity; and, (3) fruits and vegetables when processed at different maturity stages.

Hort. 152

Ohio

Evaluation of Fruit Varieties for Processing (Canning and Freezing). 2. Fruits. (1) Evaluate new and commercially important fruit varieties and selections as to quality characteristics after processing in relation to raw product quality; (2) learn processed product yields of these new and commercially important fruit varieties; and, (3) obtain experimental data on which to base recommendations to Ohio growers, processors, and consumers as to those varieties most suitable for processing.

Hort. 157-2

Wis.

Freezing Wisconsin Food Products as a Means of Creating New Markets. (1) Evaluate freezing adaptability of fruits and vegetables commercially important to state in order to use facilities available in food plants; (2) study applicability of freezing storage to production of new food products not now produced in state; (3) compare effect of processing operations for freezing on marketing quality of fruits and vegetables; and, (4) study effects of quick freezing, plate freezing, and immersion freezing on overall quality and consumer acceptability of processed products.

Dairy and Food Indus. 1051 Coop. USDA

Disease Control

Idaho

The Identity and Control of Cankorous Aerial Disorders in Orchard Trees. To (1) determine the presence and distribution, with respect to host and locality, of various kinds of cankerous aerial disorders in orchards of Idaho deemed serious enough to warrant investigation; (2) determine causes of disorders; (3) determine satisfactory and practical curative or preventive measures for disorders found and deemed serious enough to warrant commercial control programs; and, (4) release of this information through proper channels.

Plant Path. 250 Coop. USDA

Ill.

Orchard Spray Improvement. To (1) study and evaluate inorganic and organic chemicals used for plant disease control under laboratory, greenhouse, and field conditions; and, (2) relate performance of materials to many factors associated with fruit disease control and yield of quality fruit.

Plant Path. 68-377

Ind.

Identification and Control of Tree and Small Fruit Virus Diseases in Indiana. To (1) survey by indexing fruit varieties, clonal stocks, and native plants of fruit species for presence of virus diseases; (2) learn host range and role of host species and environmental factors in disease syndrome of fruit virus diseases; (3) spread and economic loss occasioned by virus diseases in fruit plants; (4) study control of fruit virus diseases by heat and chemical therapy; and, (5) maintain virus-free sources of important fruit varieties for small-quantity distribution to propagators within the state.

Hort., Bot., Plant Path. 882 (NC-14. See Part 17, Section c)

- Ind. Studies of Etiology, Epidemiology and Chemical Control of Fruit Diseases. Learn effectiveness of (1) fungicides, combinations of fungicides, and of additives for control of tree fruit and small fruit diseases; (2) nematocides for control of nematodes in small fruit and tree fruit plantings. To obtain (3) information on developmental physiology of tree fruits and relate changes in physiology to susceptibility to rotting organisms; and, (4) additional information on factors favoring development and spread of B. ribis and related fruit rotting organisms.
Bot., Plant Path. 953
- Maine Virus Diseases of Deciduous Tree Fruits. To (1) learn extent and importance of virus diseases in apple and cherry varieties grown in Maine; (2) study epidemiology of disease and insect vectors involved; (3) develop an accurate method of indexing deciduous tree fruits for virus infection; and, (4) devise a workable method of control.
Bot., Plant Path. 55 (NE-14. See Part 17, Section c)
- Mich. Tree Fruit Virus Diseases.--Stone Fruit Virus Diseases.
--Pome Fruit Virus Diseases. To (1) learn virus content and extent in stone fruit stock by further survey and indexing; (2) learn new or undiscovered viruses by indexing trees with unusual symptoms; (3) learn, more accurately, host ranges of several important viruses; (4) investigate possibility of new and more effective control measures; (5) investigate viruses of root stocks and develop disease-free root stock sources; (6) develop and maintain disease-free sources of varieties of stone fruits; (7) investigate stony-pit virus of pears; and, (8) learn host range of viruses on Hyslop crabapple.
Bot., Plant Path. 36 Coop. ARS
- Minn. Fruit Diseases.--12. Diseases of Tree Fruits and Methods of Control. To determine (1) resistance of pear varieties and seedlings to fire blight; and, (2) fungi causing wood decay in apples in Minnesota and the conditions which favor the development of decay.
Plant Path., Bot., Hort. 2206-12
- Miss. Investigation of the Diseases of Fruit Crops and Their Control. To (1) identify and study pathogenic organisms concerned with fruit diseases in Mississippi; (2) study factors concerned with early "dying-out" of peach trees within orchards; (3) develop effective and simple spray program for control of peach scab, bacterial spot, and brown rot of peach; apple bitter rot and blotch; and other fruit diseases as deemed feasible; and, (4) explore and study other methods of practical disease control among various fruit crops as deemed necessary.
Plant Path. HL-8

- N. Y. Virus and Virus-Like Diseases of Tree Fruits. 4. Pro-
(Cornell) duction and Maintenance of Virus-Free Nursery Foundation
Stock of Commercial Fruit Varieties. To (1) produce and
maintain virus-free clones of various species and varieties
of fruit trees, and establish healthy seed source trees for
rootstock production; and, (2) improve present methods of
indexing for determination of freedom from viruses.
Plant Path., Pomol. 87-4 (NE-14. See Part 17, Section c)
- N. Y. Nematodes Parasitic on Roots of Fruit Trees. To (1)
(Cornell) assess the damage to fruit trees by plant pathogenic nematodes;
(2) devise control methods for diseases caused by nematodes;
and, (3) clarify life histories of plant parasitic nematodes,
learn influence of environmental factors on their development
and pathogenicity, clarify relationships between nematodes and
other organisms in causing diseases of roots of fruit trees.
Plant Path. 188 (NE-34. See Part 17, Section a)
- N. Y. The Control of Nematodes on Horticultural Crops. To (1)
identify species of nematodes associated with root injury or
declined vigor in commercial fruit plantings; (2) show if
species are pathogenic to host; and, (3) develop control for
crops where a nematode problem is ascertained as a result of
this project.
Plant Path., Hort. 8 (NE-34. See Part 17, Section a)
- Ohio The Control of Fruit Diseases. 2. The Control of Fungus
Diseases of Stone and Small Fruit Plants. To (1) learn effect-
iveness, safety and economic value of new fungicides for con-
trol of fungus disease of stone and small fruits; and, (2)
develop more effective and cheaper fungicide spray schedules
for peaches, plums, and cherries.
Bot. 15-2
- Oreg. Virus and Similar Diseases of Orchard Trees. To determine
identity and distribution of virus and virus-like diseases of
orchard trees.
Plant Path., Ent. 44
- Wash. Fruit Spot and Related Physiological Disorders of Fruits.
To study fruit spot and related physiological disorders of
fruits to determine cause and get data on value in the control
of such disorders.
Hort. 426

W. Va.

Biology and Control of Nematodes Affecting Fruit Trees and Forest Tree Seedlings. To learn (1) effect of nematodes on growth and productivity of young fruit trees, nature of parasitism of ecto-parasitic nematodes on roots, deciduous fruit tree host range of parasitic nematodes found in state, and suitable nurse crop for rearing cultures of nematodes, measures suitable for commercial control of nematodes on young trees, extent that toxic materials are absorbed and translocated, and if this causes off-flavor; (2) role of nematodes in lack of productivity and early decline of established plantings of fruit trees, and failure of replant trees to thrive, occurrence and relative importance of nematodes in commercial orchards in state, effective control measures of nematodes in declining orchards, and how they affect replant trees in established orchards, learn extent that toxic materials are accumulated and translocated within mature fruit trees, and if this causes off-flavor; and, (3) identity of nematodes and associated diseases on productivity of forest and shade tree nurseries, specific identity of nematodes and their role in root disease complex on nursery stock, cultural and chemical control practices that increase or decrease incidence and severity of nematodes and nematode-disease complexes.

Plant Path., Bact., Ent. 72 (NE-34. See Part 17, Section a)

Wis.

Orchard Fruit Diseases and Their Control, Especially Apple Scab, Fire Blight and Rust and Cherry Leaf Spot and Brown Rot. To develop a basis and more effective method for control of the chief destructive diseases of fruits in Wisconsin.

Plant Path. 301-a

Insect Control

La.

Biology and Control of Insects Affecting Vegetable and Fruit Crops. To (1) obtain more complete information on biology of insects affecting vegetable and fruit crops; (2) evaluate damage caused by various species; (3) develop control measures allowing for production of vegetable and fruit crops free from insect damage and excessive insecticide residues; and, (4) investigate possibilities of using cultural practices, time of planting methods and virus diseases of insects as further means of control.

Ent. 406

Maine

The Influence of Modified Spray Programs on Parasites and Predators of Orchard Insect Pests in Maine. Learn (1) extent, occurrence, and importance of parasitic-predatory fauna; (2) species which might effect orchard insect pest control under state conditions, and degree of control expected; (3) length of time that must pass before these biological agents effect control of pests in an orchard removed from a standard control practice and placed on a modified program, and extent of damage by pests until they are brought under control; and, (4) factors promoting an increase and maintaining a balance between agents and hosts.

Ent. 108

- Mo. Investigations and Control of the Codling Moth and Other Fruit and Vegetable Insects. To (1) develop more efficient spray program for control of insects and mites attacking tree fruits; (2) develop effective program to control insects and mites attacking small fruits; (3) study biology of arthropod pests of vegetable crops and develop better methods for their control; and, (4) study residues of chemicals applied to fruits and vegetables under field and laboratory conditions.
Ent. 31
- N. Y. Pesticide Residues on Apples and Grapes at Harvest and at Intervals During the Growing Season. Learn residues at harvest on apples and grapes grown in this area, especially where mixed pesticides have been applied. Learn interval between last application and time of harvest so that federal tolerances can be met.
Food Sci. and Tech. 19 (NE-36. See Part 7, section a)
- N. C. Biology, Ecology and Control of Insects Affecting Peaches and Apples. To learn (1) prevalence and importance of various insects affecting peaches and apples in North Carolina; (2) life history, habits, and biology; (3) ecology of peach and apple insects; (4) relationship of parasites and predators to abundance of insects; (5) effect of insecticides on the tree, fruit, parasites, predators, pollinating insects and injurious insects; and, (6) better methods of control.
Ent. H-42
- Utah The Control of Mites and Insects on Fruit Trees. Evaluate available miticides in control of mites on fruit trees, learn optimum time and rate of application and their effect on other harmful and beneficial insects in orchards. Fit more effective miticides into well rounded spray program by integrating mite control program with best control for other insects. Study habits and distributions of species in State to learn importance of species found on fruit trees.
Ent., Hort. 431

Economics and Marketing

Calif. Economic Factors in the Selection of Products and Markets and in Plant Location and Organization in the Freezing of California Fruits and Vegetables. To (1) learn physical and economic relations in the assembly of product and operation of freezing plants for western fruits and vegetables, such as: effects on costs of these factors a. processing methods and plant organization, b. type and number of products handled in a single plant, c. plant location and scale of operation; (2) learn supply, demand, and price relations for frozen fruits and vegetables, including: a. quantification of major determinants of prices and regional rates of consumption, and b. projection of changes in regional rates of consumption in response to changes in population, incomes, prices, and tastes; (3) learn competitive position of California frozen fruit and vegetable industry in the national market; and, (4) project efficient pattern of growth of industry.

Agr. Econ. 1571 Coop. AMS (WM-17. See Part 14, Section b)

Calif. Costs and Efficiency in the Marketing of Selected California Fruits and Vegetables. To (1) determine basic physical and economic relationships involved in the operation of deciduous fruit packing houses; (2) indicate how changes in work methods and type of equipment and in-plant organization will affect efficiency and costs; and, (3) on the basis of above, develop practical means for improving efficiency in operation of California deciduous fruit packing houses.

Agr. Econ. 1574 Coop. AMS

Calif. Engineering, Qualitative and Economic Studies of the Packaging, Handling and Shipping of Deciduous Fruit. To (1) develop new containers, suitable equipment and improved techniques for packaging and handling deciduous fruit, and determine how these developments influence plant operations, packing and shipping costs and quality of product at consumer level; (2) determine basic laws underlying volume fill in containers for various shapes and sizes; (3) work with container manufacturers in developing suitable containers and standardizing packages as soon as basic principles are established; (4) develop improved equipment for more accurate sizing of fruit if needed; (5) if sorting on basis of color becomes necessary, apply known principle of electronic color sorting; (6) study car loading patterns to determine best arrangements for full or partial shipments on containers of various types; (7) determine best methods of pre-cooling fruit packed, or to be packed, in various type containers; (8) keep continuous record of condition and quality of fruit from time it leaves tree until reaching final consumer; (9) study influence of maturity on handling and packaging; and, (10) make economic studies of pilot packing lines to compare with studies of conventional methods.

Agr. Engin., Pomol., Econ. 1579

Calif.

The Marketing of Deciduous Tree Fruits and Berries in Both Fresh and Processed Outlets as Influenced by So-Called Transit or Market Disorders, with Special Emphasis on the Physiological Effects of Control Treatments. To learn (1) effect of recommended control measures for pathogenic organisms on physiology of said fruits; (2) cause of post-harvest physiological disorders; (3) relationship of factors favoring development of disorders; (4) ways of preventing or reducing disorders; and, (5) ways to cause growers, shippers, and processors to institute ways of eliminating disorders.

Agr. Econ., Pomol., Plant Path. 1656

Ky.

Evaluation of the Market for Fresh Fruits and Vegetables at the New Louisville Produce Terminal. To (1) record kinds and quantities of fruit and vegetables sold on New Louisville Produce Terminal by grades and package forms at various prices and dates; and, (2) learn how locally grown produce can be graded and packaged, and when it should be available to make it most acceptable to the trade.

Agr. Econ. 42

La.

Marketing Fruits and Vegetables. To (1) study marketing methods and practices of producers and marketing agencies to find means of effecting improvements which will increase efficiency and reduce costs of operations, maintain or improve product quality, and stimulate demand; (2) analyze nature and organization of marketing agencies as to adequacy of servicing, facilities, charges, etc.; (3) learn most profitable market outlets for Louisiana fruits and vegetables during different seasons of the year; (4) study sweet potato storage practices and costs to find conditions under which storage at various stages in marketing is economical; and, (5) obtain data on fruit and vegetable processing, as a basis for pricing, to learn most profitable outlets, appraise production potential of the industry, and learn labor and material needs of processors.

Agr. Econ., Hort. 725

La.

Marketing Figs. To (1) improve and expand existing markets; and, (2) learn storage and handling requirements of fresh figs.

Hort. Res., Agr. Econ. 974

Mass.

The Role of Cooling Methods, Chemical Washer, and Pre-Packaging in Improving the Quality of Fresh Fruits and Vegetables. To improve present marketing practices and quality of New England fresh fruits and vegetables by application of technological advances in cooling methods, chemical washes, and pre-packaging, studying blueberries, cranberries, raspberries, strawberries, peaches, grapes, asparagus, green beans, peas, corn, onions, celery, potatoes, lettuce and spinach.

Food Tech. 68

N. Y. A Study of Handling Methods to Improve Fruit Marketability.
(Cornell) To (1) investigate potential of hydrocooling peaches prior to shipment to market; (2) measure rate of cooling in commercial storages to demonstrate presence or lack of sufficient rate of cooling; (3) learn possibilities of control of storage scald by applying diphenylamine to apples in a hydrocooler; (4) learn if apples moving from orchards in different storage conditions reach storage in about same condition; (5) demonstrate means of control of weight loss of Golden Delicious apples in commercial storages; and, (6) study means of educating handlers and reducing bruising on apples.

Plant Path., Pomol. 140

N. Y. Changes in Costs of Marketing Apples Associated with Current
(Cornell) tailment or Expansion in Consumer Services. To (1) learn comparative costs of different types and methods of consumer packaging.

Agr. Econ. 191

Tex. Analysis of the Fruit and Vegetable Marketing Problems of East Texas with Respect to Harvesting and Packing Practices, Market Organization and the Competitive Position of the Area.
To (1) evaluate present fruit and vegetable harvesting and packing practices in area with respect to their effect on final market quality of product and effect on demand for products in relation to current standards and requirements of trade; (2) make economic analysis of general efficiency of present market organization and its facilities, from viewpoint of sellers and buyers; and, (3) learn general competitive position of East Texas in commercial production of specific fruit and vegetables indigenous to area.

Agr. Econ., Hort. 1053 Coop. AMS (SM-8. See Part 14, Section b)

Utah Marketing Fruits and Berries Grown in Utah. To determine (1) organization of agencies engaged in production and marketing of Utah fruits and berries, including functions of major handlers, their major sources of supply and market outlets; (2) ways to improve and increase acceptance by the trade and consumers in both Utah and out-of-state markets of Utah grown fresh fruit; (3) alternative outlets for Utah fruits, particularly of lower grade, including also new markets for fruit for fresh consumption and also markets in a variety of processed forms; and, (4) amount and type of processing, packing and storage facilities needed and that are best adapted to Utah conditions for proper preparation and sale of fruits, including form of economic organization best adapted to provide facilities and related services.

Agr. Econ., Hort., Home Econ. 435

APPLES AND PEARS

Breeding

- Ill. Inheritance and Breeding of Commercially Important Characters in the Apple. To (1) develop commercial varieties with a higher level of disease resistance adapted to Illinois, ripening at different seasons and suited to specific purposes; and, (2) study the inheritance of characters.
Hort. 65-323
- Miss. Selection and Breeding of Pome Fruit Varieties. To select by testing for yield and adaptability and to develop by breeding, varieties of apples and pears that will be suitable for home and commercial orchards, local markets, and adapted to Mississippi.
Hort. HK-2
- N. J. Apple Breeding. To (1) develop early ripening, red, firm, high quality, dual purpose varieties, and attractive, dessert quality, dual purpose varieties with a long storage life and good handling properties; (2) use triploid and tetraploid varieties in the breeding program if they possess desirable combinations of characters not present in diploid varieties; (3) use promising mutant material obtained from high energy irradiation of apple material under project 366; (4) develop acceptable commercial varieties throughout the ripening season that are resistant to disease; and, (5) maintain, assemble, and evaluate apple varieties and selections.
Hort. 327
- N. J. Pear Breeding. To (1) develop commercially acceptable varieties of pears resistant to fire blight and other diseases; (2) develop satisfactory method of artificial inoculation of young seedlings; (3) establish and evaluate pear varieties, selections, and chance seedlings as potential germ plasm for breeding program; and, (4) evaluate disease resistance, especially to fire blight, among seedlings produced in connection with this project and the clones assembled under Objective (3).
Hort. 342 Coop. USDA
- Oreg. Maintenance of a Repository for Germ Plasm of Pears and the Evaluation of a New Germ Plasm. To (1) receive potentially valuable plant materials of pear species, etc., from primary sources or regional introduction stations for propagation, maintenance and evaluation of germ plasm; (2) make available to fruit breeders or other scientific personnel, propagations by buds, scions, or grafted trees; and, (3) initiate program of evaluating, cataloging, multiplying, and distributing introduced types, varieties, and strains of pears.
Hort. 46-4 (W-6)

Tenn. Breeding for Fire Blight Resistance. To develop varieties of pears, apples, and quinces combining resistance to fire blight and resistance to other diseases with commercial quality.
Hort. 117

Va. Breeding New Varieties of Apples Especially Adapted to Conditions in Virginia. To (1) develop new varieties of apples well adapted for commercial production, study types late in season of blooming, resistant to disease and insects; and, (2) conduct fundamental work including studies of pollination values and cytological relations of Virginia apple varieties and production of polyploid types of apples.
Hort. 86003

Varieties

Ohio Multiplication, Preservation and Determination of Potential Value of Pear Varieties for North Central States Introduced Into and Collected within the United States. To (1) determine adaptability of newly introduced or recently produced pear varieties to the environmental conditions of the North Central States; and, (2) preserve those varieties having potential value either for plant breeding or for other programs in the North Central States where true-to-name source of plant material is necessary.
Hort. 73 (NC-7)

Culture

Colo. The Effect of Timing, Method of Application and Source of Nitrogen on Delicious Apples. Learn effect of timing, method of application, and source of N on chemical composition, growth, color and yield of Delicious apples in Western Colorado.
Hort., Agron. 43

Del. Apple Soil Management. To determine the best soil management practices for apple orchards in southern Delaware.
Hort. 50-H

Maine Fertilizer Experiments with Apples. To (1) determine effect of major nutrient elements and mulches on yield and quality of apples; (2) determine if effect of mulching can be attributed to addition of mulch itself, or to addition of extra nutrients it contains; (3) study effect of 2 N rates with and without supplemental Mg on growth and yield of young apple trees; (4) study effect of several mulch materials on root distribution of young apple trees; and, (5) establish general levels of nutrition in apple trees through the state by use of foliar analysis.
Hort. 8

- Maine Growth Regulators on Fruit Crops. To study effect of various chemicals on fruit set, fruit size, and preharvest drop of apples, blueberries, and other fruit crops.
Hort. 38
- Maine Hardy Trunk-Forming Stocks for Apples. To (1) evaluate adaptability of various trunk-forming stocks to the varieties of apples now being produced in Maine; and, (2) propagate better stocks for future experimental test plantings.
Plant Path., Ent., Hort. 100 Coop. ARS
- Mass. The Nutrition of Apple Trees. To (1) increase knowledge of the effect of different levels of nitrogen on growth, yield, color, and keeping quality of fruit as maintained by soil applications of nitrogen fertilizer, mulching materials and complete fertilizers; (2) find out effect of different levels of nitrogen on chemical composition of foliage and intake of mineral elements into the tree in relation to availability in the soil; (3) determine if application of elements to soil other than nitrogen are necessary to maintain maximum growth and yield; and, (4) determine level of nitrogen which will produce highly colored apples of maximum storage life without losing yield and tree vigor.
Hort. 96
- Mo. Hormone Sprays for Fruit Thinning and Control of Pre-Harvest Drop. To (1) compare NA-Am and IPC at various concentrations with NA for thinning Jonathan and Golden Delicious apples in 2 or 3 commercial orchards; and, (2) compare 2, 4, 5-TP at various concentrations with NA for preharvest drop control of Wealthy, Jonathan and Winesap varieties in 2 or 3 commercial orchards.
Hort. 195
- N. H. The Use of Rootstocks and Interstocks as a Means of Securing Smaller, Hardier, and More Productive Apple Trees. To designate rootstocks or interstocks for selected commercial apple varieties which will modify the trees to meet certain ideals as to size, hardiness, productivity, and early fruiting.
Hort. 64
- N. Mex. The Evaluation of Clonal Apple Rootstocks for the Production of Dwarf or Semi-Dwarf Trees and for Resistance to the Woolly Aphid Insect. To (1) compare and evaluate growth, production and other economic characteristics of trees of commercial apple varieties grafted on certain clonally propagated rootstocks; and, (2) evaluate rootstocks for resistance of Woolly Apple Aphid.
Hort. 56

- N. Y. Control Methods for Magnesium Deficiency in New York
(Cornell) State Apple Orchards. To find a means of control of magnesium
deficiency which becomes effective more rapidly than present
control methods.
Agron., Pomol. 139
- N. Y. Inducing Earlier Fruit Production by Shortening the
Duration of the Juvenile Stage in Seedling Apple Trees.
Learn (1) physiological and biochemical conditions constituting
juvility; and, (2) a means to shorten or eliminate period.
Pomol. 11
- N. Dak. The Influence of Hardy Stocks on Cold Resistance in
Apples. To investigate possibility of extending range of rel-
atively hardy apple varieties to colder regions by growing
them on several hardy stocks and interstocks which are known
to be hardy in North Dakota.
Hort. 12-2
- Pa. The Effects of Differential Nitrogen and Potassium Fer-
tilizer Treatments on Leaf Analysis, and Yields and Quality of
Apples. To (1) develop accurate nutritional standards for
apple trees through use of leaf analysis; and, (2) establish
a basis for sound fertilizer recommendations in apple orchards
in important fruit growing areas of Pennsylvania.
Hort. 874-D
- Pa. A Comparison of Asiatic Crabapples and Delicious Seedlings
as Rootstocks. To make a practical comparison of the five
leading apple varieties in the East grown on three species of
Asiatic crabapples and on Delicious seedlings as rootstocks.
Hort. 1123
- R. I. Comparison of Various Apple Rootstocks. To (1) determine
practicability of growing dwarf and/or semi-dwarf trees on a
commercial scale, studying and comparing yields of apple trees
on various stocks, and cost of bringing trees into production
and cost of fruit per bushel; and, (2) study adaptability of
dwarf apples for backyard growers, as to production of fruit
for home consumption.
Hort. 504
- Vt. Development of a Semi-Dwarf Apple Orchard. To determine
whether semi-dwarf apple trees have commercial possibilities
in Vermont as to (1) increase per acre yields; (2) help reduce
spraying and harvesting costs; and, (3) observe hardiness and
general growth response.
Hort. 58

- Va. Fungicide and Insecticide Compatibilities in Orchard Spraying. To determine (1) fungicidal effectiveness of standard fungicides; (2) pesticidal potency of insecticides and acaricides; (3) phytotoxic character of combinations of these products used in simultaneous combinations; and, (4) safety and effectiveness of certain fungicides when used in alternating sequence.
Ent., Plant Path. and Physiol. 86020
- Va. Boron Nutrition of Plants. To study (1) boron requirements of apples; and, (2) relationship between volatility of boron in ashing of plant samples and boron requirements.
Plant Path. and Physiol. 86028
- W. Va. Nutrition of Apple Trees in West Virginia. In an area study, learn (1) most efficient and economical use of N applied as spray; (2) if N reserves in apple trees can be maintained by N sprays alone; and, (3) effect of N sprays on biennial bearing, fruit size, fruit color, storage life, and fruit set. In study of nutrient status of apple orchards, (1) evaluate nutrient status of commercial orchards as learned by leaf analyses for N, P, K, Ca and Mg; and, (2) learn where in the State, nutrient deficiencies might be appearing and to what extent such a situation may exist.
Hort. 16
- W. Va. The Effect of Certain Chemicals on Color, Finish, and Maturation of Apples. To (1) learn effect of chemicals on quantity and quality of color of apples; (2) investigate chemicals which may improve finish on apple varieties, particularly Golden Delicious; and, (3) investigate chemicals which may accelerate maturation of apples and/or decrease interval of time existing between first and last fruits that become mature.
Hort. 39
- W. Va. The Effect of Chemical Spray Schedules on the Quality and Quantity of Apples Produced. To Determine (1) effect of various insecticides and fungicides and time of application on the quantity and quality of fruit produced; and, (2) relative cumulative as well as current season's effect of various spray schedules on fruit set, yield, color and finish. Sixteen-year old apple trees will be used. One tree each of: Delicious, Stayman, York, Rome, and Golden Delicious will be in each plot (replicated 7 times per treatment). Ten schedules will be tested. Spray applications will be made with conventional high pressure equipment with single nozzle gun, or an 8-nozzle broom gun. Records of condition of foliage, fruit set, yield, size, color, finish, maturity, and keeping qualities, also insect and disease control results will be kept.
Plant Path., Bact., Ent., Hort. 83 Coop. ARS

Harvesting and Storage

- Maine Harvesting and Storage Experiment with Maine Apples.
To learn (1) adaptability of Maine apples to controlled atmosphere storage; (2) proper time of harvest for best storage; (3) effects of various fertilizer and mulching treatments on storage life, quality, and color of fruit; (4) effect of use of carbon filter systems on storage life; and, (5) keeping quality of red sports of varieties as compared to standard variety.
Hort. 83
- Maine Developing More Efficient Handling of Apples in Storage and Packing Plants. To (1) learn efficiency of alternative methods and facilities in storing, sizing, grading, packaging, and shipping Maine apples from farm and commercial storages; and, (2) develop and test certain facilities and handling methods in experimental storage and packing house at Highmoor Farm.
Agr. Econ. 88 Coop. AMS (NEM-19. See Part 14, Section b)
- Mass. Study of Mechanical Injury on McIntosh Apples During Harvesting and Packing. (1) In 1957, study several orchards during harvest to learn probable causes of the relatively high percentage of bruises that appear to occur in the orchard. (2) During fall and winter, make a study at these orchards of packing procedure.
Hort. 94
- N. J. Factors Influencing the Storage Life of Apples. To learn factors (1) related to occurrence of scald; (2) affecting moisture loss and nest rot; and, (3) operative under storage conditions affecting storage life.
Plant Path. 478
- N. Mex. Evaluation of Indices of Maturity in Apples. To (1) learn certain physical and chemical changes of maturing apples under New Mexico conditions; and, (2) evaluate certain indices of maturity in order to learn correct time of harvesting fruits for maximum keeping quality.
Hort. 23
- N. Y. The Effects of Controlled Atmosphere Storage on the Keeping Qualities of Apples and Other Fruits. To determine temperature requirements and exact proportions of carbon dioxide and oxygen required for different apple varieties.
Pomol. 136

N. Y. Studies on the Basal Metabolism Rate of Various Apple
(Cornell) Varieties. To use the measurement of the basal metabolism
rate (respiration rate) of apples to build up a store of
information that may be used in practical application.
Pomol. 138

Oreg. Physiological Problems in Relation to the Maturation
and Storage of Fruits. 3. Methods for Improving the
Keeping Quality of Anjou Pears in Cold Storage. To investi-
gate methods for extending storage life of Anjou pears three
methods will be studied. (1) Lowering storage temperature.
Use an experimental storage room in Horticulture Department
where temperature, humidity, and air movement rate are closely
controlled. Store pears at 28-28.5° core temperature, with
95-96% humidity. Store control at 30° with same humidity.
Follow differences in firmness, skin blemishing, color,
soluble pectin, and eating quality. (2) Control of volatiles.
Store samples of pears in storage room with activated carbon
scrubber units and in similar room without carbon. Keep
both storage rooms at 30°, using similar lots of pears which
represent various growers, locations, sizes, etc. Make pres-
sure tests and soluble pectin analyses monthly during storage.
Analyze carbon to determine percent saturation, which affects
efficiency of absorption. (3) Modified atmosphere storage.
Make tests with modified atmosphere storage during 1952-53
season, with procedures to be outlined after survey of liter-
ature on types of equipment and concentrations of CO₂ and
oxygen.
Hort. 47-3

Oreg. Cost and Efficiency Comparisons of New Methods and Equip-
ment Used in Handling and Packing Winter Pears. To (1) learn
and evaluate comparative costs and efficiencies of new hand-
ling and packing methods and equipment; and, (2) recommend
changes in methods and equipment that will reduce costs and
increase efficiency in handling and packing at shipping point.
Agr. Econ. 281 (WM-19. See Part 14, Section b)

Va. Maturity and Physiological Responses of Apples as Influ-
enced by Fertilization, Spray Practices, Environmental Condi-
tions, Harvesting and Handling. To (1) develop maturity stan-
dards for harvesting apples for early market and for cold
storage; (2) learn influence of weather and cultural practices
on quality, condition and storage life; and, (3) evaluate
influence of spraying, fertilization, harvesting and handling
practices on quality, condition and storage life.
Hort. 86006

Va. Storage Life and Physiological Responses of Apples for Fresh and Processed Market as Affected by Fruit Condition and Storage Treatments. To (1) investigate development of scald, internal breakdown and other storage disorders as related to storage conditions and maturity characteristics of fruit at harvest; and, (2) learn quality of processed apple products as influenced by physical characteristics and chemical composition of raw fruit, and effect of storage conditions prior to processing.

Hort. 86099

Wash. Maintenance of Deciduous Fruit Quality During Handling and Storage. To learn (1) controlled atmosphere treatments which will extend the shelf life of fruit after its removal from storage; and, (2) when extension becomes effective and how long it is prolonged by treatment.

Hort. 1131

Processing and Utilization

Mo. Technology of Apple Products. To (1) develop a technique for making a good frozen concentrated apple cider which would appeal to the consuming public, characterizing the quality factors of astringency, body, relative sweetness, color, flavor, and aroma for each variety; and, (2) develop a continuous mechanical device for apple juice extraction, that would be better as to yield, quality, and sanitation than the present batch-wise presses.

Hort. 233

N. Y. The Yield and Quality of Frozen Apple Slices Prepared by Different Methods of Processing. To determine yield and quality of frozen material that may be obtained when apple slices are blanched by different methods after varying periods in cold storage.

Food Sci. and Tech. 3b

Ohio Factors Affecting the Quality of Ohio Cider. To learn (1) chemical composition of representative samples of cider made in different locations of the state; (2) quality of above cider by organoleptic methods; (3) apple variety blend that produces best quality cider; (4) compare quality of cider made in various parts of state with cider made under controlled conditions with viewpoint of making recommendations for improving quality; (5) increase nutritive value of cider; and, (6) learn acceptability of preservative methods and chemical preservations for cider.

Hort. 155

- Oreg. Physiological Problems Relating to the Maturation and Storage of Fruits. 4. Pear Packaging Problems. Obtain information relative to use of new packaging materials for pears, principally (1) effect of package on fruit metabolism, longevity and quality in storage; (2) requirements and tolerances of specific pear varieties with reference to atmospheric conditions within packages; and, (3) adaptability of packages to commercial storage conditions.
Hort. 47-4
- Oreg. Physiological Problems Relating to Pre-Packaging of Pears. To (1) develop pre-packaging methods for pears with special reference to: prevention of friction injury and skin discoloration, control of scald without use of paper wraps; and, (2) improve market quality and consumer acceptability by pre-packaging with special reference to: improvement in color development during ripening, increase in shelf life, reduction in damage goods rate.
Hort. ES-515
- Va. Farm Work Simplification. I. Work Simplification in Apple Packing Shed Operations. To (1) apply techniques of motion and time study developed in industry to operations performed in apple packing sheds; (2) learn methods of working, arrangements of work places, and types of equipment that will reduce hours of labor required to operate apple packing sheds and to prepare detailed instructions needed by operators to carry out those plans; (3) learn principles of motion economy applying to apple packing shed operations and prepare illustrations of those principles; (4) learn those combinations of practices, facilities, and layout, under varying conditions of size, etc., which provide minimum costs at various levels of operation; and, (5) attain the following specific objectives: a. eliminate unnecessary steps, b. arrange necessary steps in best order, c. maximize productivity of each step, d. integrate necessary steps to maximize productivity of whole job, e. learn time it takes to do the jobs, and f. develop standards of work performance and techniques for achieving these standards.
Agr. Econ., Agr. Engin., Hort. 86022-1
- W. Va. The Improvement of Apple Juice. To (1) fortify and improve apple juice by adding one or more natural constituents of apples; (2) evaluate several bitter-sweet and bitter-sour crab apple varieties, alone or in blends, for improvement of flavor, body and nutritional value of apple juice; (3) determine tannin, total soluble solids, titrable acidity and Vitamin C content of juice of crab apple varieties; and, (4) establish chemical identity of flavor constituents of apple juice having desirable flavor characteristics and to use this information in achieving Objective (1).
Hort., Agr. Biochem. 21

Disease Control

- Del. Botryosphaeria Rot of Apple in Storage. To obtain information on (1) life history of the causal organisms, Botryosphaeria ribis, on apples entering, during, and after cold storage; (2) development of rot under cold storage and post-storage conditions; and, (3) control of rot by treatment of apples before entering and when leaving cold storage.
Plant Path. 16-P
- Del. Apple Fruit Rots. To obtain more information on the life-histories of the causal organisms, and to develop effective, economically sound control measures.
Plant Path. 43-P
- Maine Organic and Other Fungicides as Spray Materials for Apples. To evaluate organic fungicides as to scab control and such side effects as chlorophyll content, tree growth, yield rate, fruit quality, compatibility, and residual effects in the soil.
Plant Path. 29
- Mo. The Use of Antibiotics and Antibacterial Substances in the Control of Horticultural Crop Diseases. A. Fire Blight and Its Control. To (1) find effective and safe spray combinations and formulations of antibiotics which will control fire blight; and, (2) determine quantitative distribution between blight susceptible and blight resistant varieties of an antibiotic substance naturally occurring in apple leaves.
Hort. 27-a
- N. Y. The Fire Blight Disease of Pome Fruits and Its Control.
(Cornell) I. Influence of Soil and Cultural Conditions on Disease Development. To determine (1) if soil texture and moisture relations may influence disease development independent of influence on growth of trees; (2) influence of different nutrient levels and balance on development of disease in trees on soils different in type and moisture, and determine effect of varying soil nutrient balance on disease; (3) influence of different cultural practices as to cultivation, sod culture, and cover crops on disease development; and, (4) apply information to reduce disease development in commercial orchards.
Pomol., Plant Path. 129-1

N. Y. The Fire Blight Disease of Pome Fruits and Its Control.
(Cornell) 2. The Susceptibility of Rootstocks and Tree Framework to the Disease. To (1) develop resistant rootstock and framework for pear trees so that when infections occur they will not extend into all branches of trees and prevent infections in roots; and, (2) determine relative susceptibility of different rootstocks being developed for apples, and search for resistant selections, studying method of propagation to learn if this does influence development of infection.
Pomol., Plant Path. 129-2

N. C. Improved Control of Apple Diseases Under North Carolina Conditions. To (1) study under North Carolina conditions the life histories of apple pathogens and seasonal development of diseases that they cause in order to obtain a sound basis for development of most satisfactory control measures; and, (2) develop a satisfactory disease control program that will enable growers to decrease production costs, produce increased yields of fruit of highest quality, and market better apples.
Plant Path., Ent. H-90 Coop. SCS

Ohio The Control of Fruit Diseases. 1. The Evaluation of Fungicides and the Timing of Fungicide Application for the Control of Apple Scab and Other Fungus Diseases of Apple. To (1) learn effectiveness, safety and economic value of new fungicides used in sprays for the control of apple scab and other fungus diseases of apples; (2) learn best timing of fungicide sprays for control of each fungus disease of apples; (3) learn effectiveness of new fungicides used after infection has been initiated; (4) develop, if possible, effective abbreviated fungicide spray schedule; i.e., one which consists of less frequent spray applications and which therefore would be more economical; (5) learn effectiveness and safety of new fungicides when applied to apples as concentrates and in low gallonages; and, (6) learn compatibility of new fungicides with recommended insecticides used on apples.
Bot. 15-1

Ohio The Control of Fruit Diseases. 3. The Control of Bacterial Diseases of Fruit Plants. To develop (1) practical and effective control of fire blight disease of apples and pears; and, (2) effective control of bacterial spot of peach and other stone fruits.
Bot. 15-3

Ohio Apple Scald Control by Means of Oxidizing and Absorbing Agents at the Surface of the Skin. To investigate the use of (1) wax emulsions containing oily and greasy substances such as refined mineral oil and petrolatums as absorbers for volatiles causing scald; and, (2) reactive gases introduced into the atmosphere to combine with or oxidize the volatiles causing scald.

Hort. 153

W. Va. Apple Measles. To secure a better knowledge of the nature and cause of the diseases of apple bark commonly known as "measles" with the view of eventually working out methods of control.

Plant Path., Hort. 8

Insect Control

Colo. Influence of Orchard Management Practices on Insect and Mite Populations of Pome Fruits. To (1) maintain low orchard populations of mite pests through selective insecticidal rotations to combat build-up of resistance; (2) study beneficial species involved in reduction of populations and select insecticides least harmful to species; (3) study various types of insecticide rotation to learn which is most efficient; and, (4) environmental and cultural factors promoting populations of beneficial species.

Ent. 37

Conn. Control of Orchard Insects with Concentrated Sprays. Learn (1) efficiency of concentrated sprays applied by a mist blower in controlling mites, apple maggots, and other important pests of apples; and, (2) effect of concentrated sprays on fruit and foliage.

Ent. 318

Ind. Development of Practical Methods for Control of Insects and Mites Attacking Apples. To develop practical methods for control of mites and insects attacking apples.

Ent. 663 Coop. USDA

Maine Control of the Apple Maggot. To learn (1) insecticide or insecticide combination most effective in control of apple maggot in state; (2) effect materials have on fruit finish; (3) effect materials have on mite, predator-parasite complex; and, (4) interaction arising from use of materials in insect-disease control aspect.

Ent. 12

Ohio

Factors Influencing the Incidence of Apple Insects and Mites in Different Orchards and the Possible Utilization of these Factors in Control Programs. To (1) study underlying causes for variation in insect and mite prevalence and damage in orchards; and, (2) integrate, if possible, into orchard practice that which may be found through the first objective, to supplement and reduce present chemical control programs.

Ent. 22

Economics and Marketing

Ill.

Economics of Apple Varietal Production in Illinois. To obtain data on the grower level on net returns for major varieties of apples produced in Illinois in order to learn the relative profitableness of the different varieties.

Agr. Econ. 05-347

Maine

Development of Improved Methods on Merchandising Apples in Retail Stores. To learn (1) relative effectiveness of certain methods of merchandising practices on sale of apples by controlled experiments; and, (2) amount of grade bruises associated with methods of merchandising.

Agr. Econ. 57 Coop. AMS

Maine

Apple Farm Organization and Management Study. To (1) learn cost and returns of producing apples in various size operations and under different management practices; and, (2) suggest ways of improving efficiency of orchard practices for various size units.

Agr. Econ. 118

N. H.

Competitive Position of the New England Apple Industry with Particular Reference to New Hampshire. To (1) study existence and importance of various factors causing past trends in production, marketing, and consumption of apples; (2) study institutional framework and pricing mechanism of apple marketing system; (3) study nature and extent of competition between New England apples and apples of other regions and substitute fruits; and, (4) assess impact of anticipated changes in production of apples and other fruits, marketing costs, and consumption on New England apple industry.

Agr. Econ. 106

N. Y.

Methods and Costs of Storing and Packing Apples. Improve (Cornell) over-all efficiency of apple storing and packing in order that unit costs and fruit injury may be reduced.

Agr. Econ. 14-9 (NEM-19. See Part 14, Section b)

N. Y. A Study of Causes of Variability in Production Costs
(Cornell) and Returns for Apples in Western New York. To (1) learn
amount and cost of various physical inputs and the pro-
duction resulting for commercial apple enterprises of
different sizes in western New York; (2) consider varia-
bility in production costs for different sizes of apple
enterprises and learn reasons for variability; and, (3)
learn nature of cost-size relationships for different
items of equipment commonly used in fruit production.
Agr. Econ. 177

Ohio Methods, Costs and Efficiencies in Grading, Packaging
and Marketing Apples. To (1) determine costs for various
methods of grading, packaging, and marketing of apples
under various scales of operation; (2) compare relative
efficiencies of farm, wholesale and retail store level
prepackaging operations and determine probable trends in
each; and, (3) develop ideal or model plans for apple
packaging and marketing from studies and theoretical
packaging and marketing operations.
Agr. Econ., Sociol. 114

Pa. Efficiency in Packing and Storing Apples. To (1) learn
comparative costs and returns from alternative methods of
packing and storing apples; and, (2) evaluate effect of
level of utilization and scale for different types of equip-
ment used for packing and storing various types of packages.
Agr. Econ., Rur. Sociol. 1298 (NEM-19. See Part 14,
Section b)

Pa. Economic Evaluation of Bruising Damage in Harvesting
and Marketing Apples. To (1) estimate extent and learn
causes of bruising damage during harvesting and marketing
apples through processing and fresh market channels; and,
(2) evaluate and recommend methods for reducing economic
losses from bruising.
Agr. Econ., Rur. Sociol. 1338

Va. Handling Methods and Cost in the Packing and Distribu-
tion of Apples. Discover ways of reducing handling cost in
packing and distribution of apples.
Agr. Econ. 86095 Coop. USDA

Wash. Evaluation of Consumer Packages for Medium-to-Large Sized Apples from the Pacific Northwest. To (1) evaluate packing and shipping characteristics of selected packages and maintenance of fruit quality in transit to retail outlets; (2) learn costs of packing and handling selected packages as compared with types of containers in current use; (3) evaluate trade and consumer acceptance of test packages; and, (4) development of efficient work methods, machinery and equipment for packing and handling the more promising types of consumer packages.

Agr. Econ. 1362 Coop. AMS (WM-19. See Part 14, Section b)

W. Va. Handling Methods and Cost in Packing Apples. To (1) learn comparative efficiency of methods and types of equipment for sorting, sizing, and packing apples in Appalachian area; and, (2) develop and test improved methods and types of equipment for performing these operations.

Agr. Econ., Rur. Sociol., Hort. 97 (NEM-19. See Part 14, Section b)

SMALL FRUITS

N. J. Studies of the Photoperiodic Control of Flower-Bud Formation in Strawberries. To (1) learn time and range of flower-bud initiation in several strawberry varieties and if they are Short Day, Long Day, or indeterminate plants; (2) study inheritance of the flower-bud initiation response in progeny of Sparkle x Gem; and, (3) study effect of far-red irradiation on flower-bud initiation in strawberries.

Hort. 711

Breeding

Alaska Collection, Preservation, Multiplication and Evaluation of Indigenous Alaskan Rubus, Ribes, Vaccinium, and Fragaria. To (1) collect Alaska's indigenous rubus, ribes, vaccinium and fragaria varieties, establishing outstanding plants in an accessible nursery; (2) preserve desirable strains for evaluation in temperate regions; and, (3) multiply and make available to interested States any materials desired for further evaluation under their particular environments.

Hort. 74 Coop. ARS (NC-7)

Ark. Breeding of Grapes for a Productive Concord Type with Freedom from Uneven Ripening. To develop a variety of grape that will ripen evenly in Ozarks, with color, taste, and flavor similar enough to Concord to replace that variety in processing industry.

Hort. and For. 431

- Ark. Breeding Bramble Fruits and Studies of Their Cytology.
To (1) develop breeding lines and potential varieties of blackberries and raspberries adapted to growing conditions in upper South; (2) learn breeding behavior of various types of bramble fruits, based on chromosome number determinations of certain parents and their progenies; and, (3) chromosomal constitution needed for expression of mitotic instability in brambles and means of avoiding its consequences.
Hort. and For. 483
- Ga. Improvement of the Muscadine Grape Through Breeding for Higher Quality, Perfect-Flowered Types, and Increased Bunch and Fruit Size. To develop perfect-flowered muscadine grapes which have fruit quality equal or superior to the Hunt variety, but which also have sufficient bunch size to be easily harvested.
Hort. 85
- Ga. Improvement of Blackberries, Dewberries, and Blueberries Through Breeding and Selection and the Development of Adequate Production Practices. To (1) develop blackberry and dewberry varieties which are better adapted, have greater vigor, and are disease resistant in addition to having superior fruit flavor and shipping quality; (2) develop a pruning and spraying program for disease control that will give increased production and lengthen the life of bramble plantings; and, (3) work out cultural methods for blueberries which will give optimum yields.
Hort. 87
- Ga. Breeding Blueberries for the Southeast. To develop (1) home garden and commercial varieties with a sufficiently low cold requirement to be adapted to the Southeast; (2) blueberries which ripen at different times to extend season from May to July; (3) blueberries which are of large, uniform size and high quality; (4) blueberries which can be satisfactorily shipped to distant markets; and, (5) blueberries which maintain quality in storage for several weeks.
Hort. 218
- Maine The Development of Low and Semi-Highbush and Highbush Blueberry Varieties Adapted to Maine. To develop or locate superior varieties of low, semi-highbush, and highbush blueberries, having high productiveness, large berry and good quality, also easily propagated, and with rapidity of spread.
Hort. 76 Coop. ARS

Mich. Developing and Evaluating a Race of Hybrid Blueberries.
To study (1) crosses between selected low and high bush varieties of blueberry seedlings; (2) inheritance of important vegetative and fruit characteristics of several species; (3) soil and water table requirements and rooting habits of different hybrids, and correlation with type of top growth; and, (4) evaluation of different forms developed and selection of types suitable for different conditions.

Hort. 53

Mich. Strawberry Breeding and Variety Testing. To obtain strawberry varieties suitable for commercial culture in Michigan that will (1) make as good a processed product as Marshall variety, which is grown in Pacific Northwest, but does not succeed in Michigan; and, (2) be satisfactory for use on fresh market.

Hort., Bot. 87

Miss. Breeding and Testing Strawberry Varieties with Special Emphasis Upon Drought Resistance. To (1) test new varieties from breeders in South for their local adaptation; (2) develop varieties for plant production and survival during hot dry summers, by breeding and selection; and, (3) develop selections producing fruit with suitable characteristics for commercial production for fresh market, for processing, and for home gardens.

Hort. HK-9

Miss. Breeding and Testing Raspberry and Blackberry Varieties Adapted to the South. To (1) develop by breeding and selection new varieties of raspberries and blackberries adapted to hot dry summers in Mississippi; and, (2) selections with fruits suited to commercial production for local markets, processing, and home gardens.

Hort. HK-10

N. J.

Strawberry Breeding. To (1) develop a series of varieties suitable for freezing processing and consider characters as: ease of separation of calyx, small, dry scar, necked fruit shape, medium to large fruit size, uniform light or medium red flesh color, firm flesh, moderately tart or tart, high aroma, tough skin, vigorous and productive plant, strong, upright fruiting cluster; (2) develop series of varieties suitable for fresh market and consider characters as: light, glossy outside red, light colored seeds, showy calyx, disease resistance, virus tolerance; (3) develop commercially acceptable, very early ripening, frost hardy varieties; (4) commercially acceptable everbearing varieties adapted to state; (5) parental material possessing special characters in combination with desirable horticultural characters and consider special characters of very large size, very late ripening, runnerless plants; fairly true breeding lines suitable for production of F_1 hybrid seed-propagated varieties; (6) use mutant material obtained from high energy irradiation of strawberry plant material under Project 366; and, (7) maintain virus-free stocks of selected seedlings and commercially important varieties in cooperation with Project 328.

Hort. 333 Coop. USDA

N. J.

Blueberry Breeding. To (1) develop improved varieties of blueberries in cooperation with USDA, consider various characters as: early ripening, very late ripening, good scar with resistance to shattering, larger size, light blue color, uniform ripening, good keeping and handling quality, etc.; (2) test selections from progenies distributed to other experiment stations and cooperating growers by USDA; (3) supervise testing and increase of promising selections; (4) develop inoculation techniques in cooperation with Departments of Plant Pathology and Entomology and with USDA for evaluation of seedlings and selections for resistance to disease and for virus tolerance; (5) introduce by interspecific hybridization early ripening and hardiness from northern lowbush blueberry and superior scar and drought resistance from rabbiteye blueberry into the high bush variety; (6) use mutant material from high energy irradiation of blueberry plant material under Project 366; and, (7) maintain a variety test planting of commercially important varieties, new varieties, and a "living herbarium".

Hort. 368 Coop. USDA

N. C.

The Breeding of Bramble Fruits. To (1) develop by breeding new home and market varieties of raspberries, dewberries and blackberries that are adapted to the South, and that are disease resistant, vigorous, productive and of good quality; and, (2) test selections developed in the breeding program with standard varieties for performance under Southern conditions.

Hort. 80 Coop. ARS

- N. C. Blueberry Breeding. To originate blueberry varieties for North Carolina and the Southeast, emphasizing: (1) very early to midseason commercial varieties with improved fruit and plant characters such as greater vigor and productivity, better adaptation to local conditions, resistance to diseases, and larger, bluer, better flavored fruit; (2) varieties ripening from very early to very late for home use and local market for all sections of the state; and, (3) evaluation of various crosses for potential value as sources of superior selections, and for information on inheritance of economic characters to improve breeding.
Hort. 82 Coop. ARS
- N. C. Strawberry Breeding. To (1) originate strawberry varieties for North Carolina and the Southeast, emphasizing a. varieties with improved plant characters as productivity, increased vigor, greater resistance to diseases, and possibly to insects and nemas, b. varieties adapted to specific uses such as shipping, preserving, or freezing, and c. varieties ranging from very early to very late with large size and high flavor for home use and local market; (2) evaluate various crosses as to potential value as sources of superior selection; and, (3) obtain information on inheritance of economic characters contributing to improvement of breeding methods.
Hort. 83 Coop. ARS
- Okla. The Improvement of Bramble Fruits by Breeding. To (1) secure varieties of promise and hybridize in attempts to produce seedling for adaptation and resistance; (2) collect and maintain a test planting of recommended varieties and evaluate newly introduced ones; and, (3) disseminate material which has indicated desirable qualities.
Hort. 595
- Pa. Breeding Improved Varieties of Raspberries. To (1) breed improved raspberries having resistance to freezing, disease, and insects, and desirable horticultural characteristics; (2) determine types and extent of virus infection; (3) identify and study insect vectors causing transmission of viruses; and, (4) study inheritance of certain characteristics.
Hort., Zool. and Ent., Bot. and Plant Path. 1094 (NE-9)
- S. C. Breeding Bunch Grapes for the Southeast. To develop varieties adapted to the Southeast possessing high quality, longevity, resistance to heat, drought, black rot, and anthracnose diseases, and which produce bunches that ripen uniformly.
Hort. 105

- S. Dak. Breeding Small Fruits for South Dakota. To develop improved varieties of such fruits as grapes, raspberries, and strawberries that are adapted to conditions in South Dakota.
Hort. 252
- Tenn. A Comparative Study of Inheritance in the Cultivated Raspberry with Reference to Certain Diseases and to Fruiting Habits. To determine the comparative values as parents of certain cultivated red raspberries when crossed with Van Fleet or other hardy types in the production of disease resistant, productive, and desirable hybrids.
Hort. 118
- Tenn. Breeding and Selection of Blackberries, Including Dewberries. To study improvement of the blackberry crop in the climatic belt including Tennessee.
Hort. 119
- Tex. Improvement of Bramble Fruits for Texas. Breed and test varieties of bramble fruits adapted to home and commerce. Study pathological and physiological diseases of same, with reference to sterility factor of Lawton variety, to learn causes and control methods. Study chemical weed control and methods of application with brambles.
Hort., Plant Physiol. and Path. 1030
- Vt. Strawberry Breeding and Variety Trials. To (1) find through varietal tests or originate improved varieties adapted to northern conditions; (2) learn parental varieties that will give late ripening varieties and those superior in early and mid-season ripening; and, (3) learn relative hardiness and disease resistance of varieties and educate growers to this.
Hort. 60 Coop. USDA
- Va. Breeding New Varieties of Grapes Especially Adapted to Conditions in Virginia. To (1) develop superior varieties of eastern bunch grapes adapted to eastern Virginia where uneven ripening of fruit, prevalence of black rot, and mildew are problems, adapt varieties to other sections where skin cracking and disease susceptibility are limiting factors; (2) develop new varieties combining desirable characteristics of European Vitis vinifera L. with American species possessing winter hardiness and resistance to disease and insects; and, (3) analysis of genetic characters and mode of inheritance in grapes.
Hort. 86082

- Wis. Development of Improved Varieties and Strains of Strawberries Adapted to Wisconsin. To develop (1) new varieties of strawberries adapted to Wisconsin conditions; and, (2) superior strains of available varieties through virus indexing and nematode control program.
Hort., Plant Path. 939

Varieties

- N. Mex. Varieties, Rootstocks, and Plant Growth Regulators in Relation to Grape Production in New Mexico. To learn (1) varieties of V. vinifera, V. labrusca, and hybrids that are adapted to State irrigated conditions; (2) influence of certain recognized rootstocks on growth, productivity, and chemical composition of fruit of selected vinifera and labrusca grape varieties; and, (3) evaluate effectiveness of plant growth regulators in reducing amount of winter injury to vinifera varieties.
Hort. 91

- N. H. Anatomy and Morphology of the Vegetative Organs of Representative Rubus Species. Learn anatomy and morphology of New Hampshire representatives of each subgenus of Rubus and representatives of each section of subgenus Eubatus (blackberries).
Bot., Hort. 103

Culture

- Ark. The Influence of Cultural Practices and Environment on the Production and Behavior of Strawberries. To (1) study relation of edaphic and climatic conditions to fruit production, quality, and characteristics, and plant maintenance, production and behavior; and, (2) determine effect of cultural practices, such as rotations, green manuring, mulching, irrigation, fertilizing, and spacing on plant behavior and performance.
Hort. 284

- Ark. Studies of the Relationship Between Nutrient Supply, Plant Vigor, and Pruning in the Production of Grapes. Study effects of an interactions between levels of N, P, K, and severity of pruning on plant vigor, fruit yield, and quality of the Concord grape under conditions existing in Northwest Arkansas.
Hort. and For. 441

Calif. Influence of Plant Regulators on Growth and Fruiting of the Vine. To (1) screen for compounds that effect the vine differently or which produce similar but better responses than those already obtained; (2) work on elongation of clusters and their branches; and, (3) study relation of plant regulators to the carbohydrate nutrition of the vine.

Vitic.& Enol. 1421

Calif. Grape Planting Stock Investigations. Investigate (1) methods of producing own-rooted vines; (2) methods of establishing vines on resistant stocks; (3) mechanization of field grafting and improvement in field grafting techniques; and, (4) treatment of rooted and non-rooted planting stock to eradicate soil pests--phylloxera and nematodes--prior to distribution or planting.

Vitic.& Enol. 1737

Del. Control of Growth and Fruiting of Strawberry by Spray Application of Growth-Regulating Chemicals. To (1) determine effectiveness of chemical plant thinning and plant spacing on vigor and yield of strawberry; (2) test efficacy of certain chemicals in regulating runner growth of certain strawberry varieties; and, (3) test efficacy of certain chemicals in promoting fruit set and/or maintenance of berry size.

Hort. 51-H

Ga. The Effect of Different Plant Spacings, Mulching with Sawdust, and Irrigation Upon the Yield and Market Quality of Strawberries. To determine (1) most satisfactory spacing of strawberries to produce high yields of good quality fruit; (2) effect of sawdust mulch on yield of strawberries irrigated and non-irrigated; and, (3) effect of irrigation on yield and quality of fruit and on livability of strawberry plants.

Hort. 90

Ky. Varieties and Cultural and Fertilizer Practices for Strawberries Best Suited to Kentucky Conditions. To test both standard and new varieties under variations in cultural and fertilizer treatments to determine best practices to follow under Kentucky conditions.

Hort. 552

Ky. Effect of Various Mulch Materials on Latham Red Raspberries. To learn effect of several mulch materials on Latham raspberries with reference to suitability of materials and amount needed, fruiting capacity, plant longevity, disease resistance, weed control, soil moisture retention, and soil temperatures.

Hort. 554

- Ky. A Study of Blueberry Production on Moderately and Slightly Acid Soils. To learn, by various cultural practices, if blueberries may be successfully grown on mineral soils of higher pH than is usually recommended.
Hort. 557
- Maine Increasing Plant Stand in Blueberry Fields. To discover factors influencing spread of blueberry; discover economical methods of increasing plant stand and originating blueberry fields.
Hort., Agr. Engin. 23
- Maine Pruning Experiments on the Low-Bush Blueberry. Main objective is to develop a pruning method which might replace burning which is now used. It is also desirable to use some conventional methods of pruning in connection with burning to find more efficient and effective procedure and equipment for fields that have factors which make burning necessary. Also to learn under various conditions if a 2-year or 3-year cycle of pruning is most profitable.
Hort., Agr. Engin. 75
- Maine Nutrition of the Low-Bush Blueberry. To learn effect of native soil fertility, fertilizers, soil amendments, growth regulators, and certain management practices upon nutrition of low-bush blueberry in relation to vegetative response and fruitfulness.
Agron. 96
- Mass. The Chemistry of Raspberry Canes in Relation to Cold Hardiness. Learn (1) dehydration intensities necessary to cause injury to a significant number of cells of raspberry canes; (2) water sorption isotherms on cane tissue during winter season and degree and extent of hysteresis; (3) seasonal variations in content of soluble protein, amino N, pectic substances, etc; and, (4) try to find relation between dehydration intensities, sorption data, and chemical composition.
Chem., Pomol. 97
- Mass. Nutrition of Cultivated Blueberries. Learn nutritional requirements of above so as to improve soil and fertilizer management practices.
Pomol. 99
- Mass. Weed Control in Cranberries. To discover best means for controlling or eradicating weeds among cranberry vines.
Cranberry Sta. 116

Mass. Cranberry Bog Moisture Relation Studies. I. Drainage of Cranberry Bogs. 2. Irrigation of Cranberry Bogs. To (1) drain cranberry bogs; (2) explore the field of cranberry bog irrigation; (3) determine optimum needs of cranberry vines at various stages of growth; (4) determine supplementary value of irrigation systems in frost protection, liquid fertilizer distribution, and insect control; and, (5) determine value of watering immediately after harvesting in assisting the vines to withstand or recover from bruising and partial up-rooting caused by picking.
Cranberry Sta. 117

Mass. Flooding Management in Cranberry Bogs. To (1) discover what conditions produce "winterkilling" injury in cranberry vines, "winter injury", and "oxygen deficiency injury" to terminal buds in the winter flood and any subsequent spring flood; and, (2) determine effect of various winter and spring flooding practices in alleviating above difficulties, and measure their effect on keeping quality of the fruit.
Cranberry Sta. 118

Miss. Studies of Problems of Production and Marketing Grapes in Mississippi with Special Emphasis on the Muscadine Type. To (1) learn best varieties to grow for marketing fresh and for processing; (2) develop methods of harvesting, handling, and marketing fresh muscadine grapes successfully; (3) learn or develop best methods of processing grapes that can be marketed at a profit to the grower; (4) find bunch varieties of good quality suitable for state growing conditions; and, (5) learn effect of certain cultural treatments on yield and quality of grapes.
Hort. HK-22

Miss. Studies of Factors Affecting Drought Resistance of Strawberry Plants. To (1) study influence of leaf pruning on drought damage to strawberry plants; (2) learn influence of light intensity in relation to air and soil temperature and soil moisture on plants during summer droughts; (3) study influence of height of row, cultivation and chemical weed control (no cultivation) on ability of plants to withstand droughts; (4) learn influence of various types of mulches on plants during droughts; and, (5) by soil determinations learn when plants should be irrigated.
Hort. HK-27

Mo. Problems in Small Fruit Culture. To (1) evaluate new strawberry varieties; (2) improve strawberries by breeding; (3) evaluate blackberry and raspberry varieties; (4) learn causes of sterility in blackberries and develop control methods.
Hort. 291

- N. H. The Development, Improvement and Maintenance of Blueberry Fields. To (1) learn reliable procedures for developing and maintaining blueberry plants on abandoned farm lands and other available areas; (2) optimum cultural practices, particularly fertilizer requirements, weed control, and the control of insects and diseases; (3) the ecological factors significantly associated with successful blueberry production; and, (4) to create improved stands through selection and breeding.
Hort. 56
- N. J. Relation Between Nitrogen Level, Pruning, Sanding and Crop Production of Cranberries. Learn (1) optimum N requirement in relation to 3 degrees of pruning; (2) coordination of N level and pruning with use of picking machines; and, (3) evaluate cultural procedure in sanding vs. pruning.
Hort., Soils 367
- N. J. The Nutrition and Culture of Small Fruits and Grapes. Investigate effects of: (1) various elements, in quantity and balance, on growth and reproduction; (2) variety and stage of development on nutrition; (3) viruses on nutrition of small fruits only; (4) soil management, rotations and irrigation on growth and reproduction; (5) insecticides, fungicides, herbicides and growth regulators on growth and reproduction; (6) varying plant populations on yield of strawberries and develop control of plant populations; and, (7) various rootstocks, pruning systems and other management practices on growth and yield of grapes.
Hort., Soils, Plant Path. 369
- N. Y. The Relation of Varietal Differences and Cultural Practices in the Ripening of Concord-Type Grapes and Grape Products. To study chemical changes during ripening under various conditions and to determine if grape processing season can be lengthened by introducing earlier Concord type varieties into commerce.
Food Sci. 3-a
- N. Y. The Effect of Variations in Pruning Severity and Training System on the Production of Fredonia, Concord, and Van Buren Grapes. To measure (1) yield of these varieties when pruned to four severities and trained to three systems; (2) the wood growth produced by grape vines pruned to these various severities and trained to these systems; (3) the yield as affected by the interaction between fertility level and pruning severity; (4) to learn the yield as affected by the interaction between height of trellis and pruning severity; and, (5) to record the depth of rooting of vines pruned to various severities.
Pomol. 12

N. C.

A Study of the Nutritional Status, Requirements, and Methods of Correcting Deficiencies of Blueberry and Strawberry Plantings in North Carolina. To (1) learn optimum nutrient-element contents of leaves of blueberry and strawberry plants in State; (2) compare these standards with leaf nutrient-element contents of State strawberry and blueberry plantings; (3) obtain basic nutritional status data to guide development of additional nutritional research; and, (4) formulate and perform corrective field experiments which will be indicated as desirable by leads uncovered through basic data developed by elementary greenhouse and survey data.

Hort., Soils H-152

Ohio

Responses of the Red Raspberry to Different Soil Management Practices, Training Systems, and Rates of Nitrogen Fertilization as Indicated by Growth, Yield and Mineral Nutrient Content of the Leaf. To determine (1) effect of different soil management practices, differential N fertilization, and training systems upon growth and yield response of red raspberry; (2) pattern of development of red raspberry fruit, and of individual druplet; and, (3) effect of differential N applications on development of fruit and individual druplet.

Hort. 27

Ohio

A Study of the Nutrient Status of Ohio Vineyards and of the Effect of Various Pruning, Soil Management and Fertilization Practices on the Growth, Yield and Quality of Grapes. To (1) survey representative Ohio vineyards to find essential nutrient element status of commercially important varieties as indicated by foliar analysis; (2) investigate severity of pruning in order to obtain information upon which specific recommendations for grower pruning practice may be based; and, (3) determine influence of various soil management and fertilizer practices on yield and quality of Concord and Delaware grapes.

Hort. 40

Oreg.

The Floral, Vegetative, and Physiologic Response of Certain Plants to Specific Temperatures and Photoperiods. To (1) obtain basic information regarding the floral, vegetative and physiologic response of the strawberry and other plants sensitive to specific temperatures and photoperiods; and, (2) ultimately obtain sufficient basic information to establish specific relation between mineral uptake, carbohydrate accumulation, protein synthesis, etc. and particular temperatures and photoperiods.

Hort. 357 (W-48. See Part 15)

- Pa. Renovation in Old Concord Vineyards. To investigate economically feasible methods for rejuvenating old Concord grape vines.
Hort., Agron. 1092
- R. I. Factors Associated with Growth and Yield of Highbush Blueberries (V. Corymbosum). To study (1) growth habits of newer varieties and, (2) effects of light, temperature, and humidity on growth. To learn (3) number of days between blossom drop and fruit maturity and, (4) influence of wax sprays applied to bushes and fruit.
Hort. 502
- W. Va. The Selection, Breeding, and Propagation of the Low-Bush Blueberry--Vaccinium Vacillans. To (1) improve the low-bush blueberry through breeding and selection; and, (2) find a cheap and reliable method of propagation.
Hort. 31
- Wis. Production of Vegetable Crops and Small Fruits Under Supplemental Irrigation. To (1) determine response of vegetable crops and small fruits to supplemental water; and, (2) devise cultural practices with vegetable crops and small fruits which will give maximum returns in yield and quality under supplemental irrigation.
Hort., Agr. Engin., Soils 913
- Harvesting and Storage
- Mass. The Mechanization of Cultural, Harvesting and Market Preparation Operations in Cranberries. To (1) design, construct, and test a self-propelled, low-gallonage, boom sprayer for insect, disease, and weed control use; (2) design and construct a light-weight, self-propelled vehicle to be used in a wide variety of cultural and harvesting operations; (3) study existing picking machines and design and make alterations for use in flood harvesting experiments; and, (4) re-design present screener and separator for fresh fruit portion of crop only.
Agr. Engin. 51
- Wash. Handling and Storage of Strawberry Plants. To (1) determine relationships between storage temperatures and lengths of storage periods on subsequent growth and survival of strawberry plants; (2) compare relative efficiencies of different package liners and methods of packing used in handling and storage of strawberry plants; and, (3) study commercial strawberry varieties in relation to their responses to storage and handling conditions.
Hort. 1373

Processing and Utilization

- Ky. The Comparative Processing and Shipping Qualities of Strawberry Varieties and Selections. Learn processing and shipping qualities of fruit of four varieties of strawberries grown in state and of selections from breeding program.
Hort., Dairy 1002
- S. C. Investigations on the Effect of Processing Treatments on the Acceptability of Products from South Carolina Grapes. Learn consumer acceptability as affected by processing treatments of grape juice and other grape products as syrups, jellies, and jams which can be made from South Carolina grapes.
Food.Tech., Human Nutr. 449
- Tenn. Relative Costs and Effects on Quality and Market Value of Hand Capping and Machine Capping of Strawberries for Processing. To (1) learn relative costs of hand capping strawberries in the field and machine capping them in the processing plants; (2) compare quality and wastage of strawberries capped by the two methods; and, (3) learn effects of refrigerated storage on strawberries capped by the two methods.
Agr. Econ., Food Tech. ES 385

Disease Control

- Ark. The Identification, Epidemiology, and Control of Plant-Borne Pathogens of Strawberry. To (1) identify various components of virus complex occurring in Arkansas strawberry plantings; (2) study methods of producing disease-free plants with view of improving and simplifying existing procedures; (3) learn importance of virus diseases to production of berries; (4) study movement and spread of viruses into virus-free plantings; (5) study relationships of other plant-borne pathogens to virus-free plant production program; and, (6) develop disease resistant varieties for local commercial requirements through hybridization and selection.
Plant Path. 412
- Ill. Investigation of Red Stele Root Rot of Strawberry. To (1) study etiology of red stele disease; (2) learn how many strains of red stele pathogen are present in State; (3) study its control by use of chemicals; and, (4) cooperate with Mr. Chester Zych of Horticulture Department in an evaluation of red stele resistance in his strawberry breeding and evaluate any new varieties developed in other areas under State conditions.
Plant Path. 68-378

- Maine Cultural and Chemical Control of Nematodes on Small Fruits and Vegetables. To learn biology and control of nematodes on strawberries, low-bush blueberries, and truck crops.
Plant Path. 93 (NE-34. See Part 17, section a)
- Maine Identification and Control of the Fungi and Viruses Causing Disease in Low-Bush Blueberries. To (1) study numbers and kinds of virus disease present and determine pathogenicity of fungi isolated from diseased blueberry plants; and, (2) learn what insect vectors are involved and develop control measures.
Plant Path., Ent. 99
- Mass. Black-Root Rot of Strawberries. To determine the cause of black-root rot of strawberries and to find effective methods of control.
Hort. 98 Coop. ARS
- Mass. Small Fruit Disease Investigation. Establishment of more practicable and less expensive methods of applying chemicals. Clarification of most effective time of fungicide applications. Test new fungicides as they are presented. Continue study of role played by oxygen in fruit set and keeping quality. Life cycle and control studies will be made of pathogens causing heretofore unknown diseases. Investigate eradicant fungicides and chemotherapeutants.
Cranberry Sta. 121
- Mich. Strawberry Red Stele Root Rot Disease: To Study Factors of Field Spread and Identification, Resistance, Physiology of the Causal Organism, New Methods of Control, and to Test New Selections Developed Through the Breeding Program for Resistance. To (1) develop technique for red stele diagnosis in field during any period of year; (2) investigate methods to learn resistance in varieties and selections which will lead to more rapid technique; (3) study physiology of causal organism which would have direct bearing on breeding and methods of control; (4) evaluate methods of eradicating the disease once present in soil, to aid in reclaiming many infected areas for strawberry growing; and, (5) determine if selections developed are red stele resistant.
Plant Path., Bot. 810
- Mo. Downy Mildew and Black Rot Control on Grapes. To find a fungicide or a fungicide combination that will effectively control both blackrot and downy mildew with little or no phytotoxic effects.
Hort. 194

- N. J. Blueberry Diseases and Their Control. To (1) learn causal agents of blueberry diseases, life histories of present imperfectly understood pathogens, and influence of environment on development of diseases; (2) develop control measures based on above determinations; (3) learn effect of chemicals used in disease control on plant growth, yields, and fruit quality; and, (4) develop procedures for screening large numbers of seedlings in search for resistance to major blueberry diseases.

Plant Path. 471 Coop. USDA

- N. J. Cranberry Diseases and Their Control. To (1) learn causal agents of cranberry diseases, life histories of present imperfectly understood pathogens, and influence of environment on disease development; (2) develop controls for above determinations; (3) learn effect of chemicals used in control on plant growth, yields, and fruit quality; and, (4) evaluate selections for good growth characteristics, disease resistance, etc.

Plant Path. 472 Coop. USDA

- N. J. Diseases of Strawberries, Grapes and Cane Fruits. To learn (1) causes, extent of losses, and control of disease of strawberries, grapes and cane fruits; (2) effect of chemicals in disease control on plant growth, yields, and fruit quality; and, (3) influence of soil temperature on development of root and vascular disease of strawberries.

Hort., Ent. 480 Coop. ARS

Insect Control

- Ark. Biology and Control of Strawberry Crown Borer. To (1) find a control program which will control crown borer without causing other problems; and, (2) learn the most effective method of application of insecticide, as well as proper timing.

Ent. 465

- Calif. Control of the Grape Bud Mite by Chemical and Cultural Methods. Devise a method of control that can be used by commercial grape growers.

Ent. 1710

Maine

Insects Affecting the Blueberry. To (1) strengthen insect pest control program and attempt to find formulations more stable under adverse weather conditions; (2) find adequate control measures for late blueberry maggot in fruit destined for frozen or fresh fruit market; (3) amplify data obtained on pollination, and learn if intensive pollination would result in a stand of undersized berries; and, (4) continue biological studies on destructive pests of blueberries.

Ent., Hort., Chem. 11

Minn.

Fruit Insect Pests. To (1) determine role of insects and mites in increasing number of crop failures that are being reported by strawberry growers; (2) select insecticides and an adequate spray schedule for control of insect pests of such small fruits as strawberries, raspberries and currants; (3) test new materials that may fit into the tree fruit spray schedules; and, (4) determine annually the nature and amount of damage that has occurred in Minnesota fruit plantings.

Ent., Hort., Plant Path. 1728

Pa.

Insect Pests of Grapes. To devise methods and evaluate materials for chemical control of grape berry moth, grape phylloxera and other grape pests.

Ent., Hort. 1251

Economics and Marketing

Calif.

The Nature of and Predisposing Factors for "Wetness" of Table Grapes and the Relationship of this Condition to Market Quality. To (1) specify what wetness is; (2) determine significance of moisture of condensation in relation to wetness; (3) determine role of condensed moisture in predisposing the fruit to decay; (4) determine significance of berry juice in relation to wetness; (5) evaluate relationship of rough handling to berry injury in terms of amount of wetness; (6) determine relationship between wetness from injury and decay incidence; (7) determine if use of excessive amounts of SO₂ for fumigation predisposes fruit to wetness; (8) determine significance of microscopic injuries such as insect punctures in relation to wetness; (9) learn changes in permeability of the skin to juice during stages of senescence of fruit during storage; (10) learn if wetness is correlated with maturity of fruit when harvested; and, (11) learn influence of different degrees and types of wetness upon market quality of fruit as indicated by wholesale and retail prices.

Agr. Econ., Hort., Plant Path. ES 456 Coop. USDA

Calif.

Physiological and Pathological Problems Associated with the Consumer Packaging of Table Grapes. To determine (1) rates and amount of SO₂ diffusing into consumer package during fumigation; (2) resistance of different types of plastic films to corrosion from SO₂ under different moisture conditions; (3) bleaching effect of SO₂ on wet printed package material; (4) size and shape of consumer packages most suitable for clusters of different table grape varieties; (5) adaptation of cluster size and shape to standard sized packages by thinning before harvest; (6) relative stem brownness and dryness of consumer packaged vs. standard shipping container packed grapes; (7) precooling rates of fruit in consumer packages vs. that in standard shipping containers; (8) relative amounts of shatter; and, (9) relative amounts of decay.

Vitic. 1640

STONE FRUITS

Breeding

Ala.

Breeding Better Varieties of Plums for the South. To (1) collect plum species and varieties to grow and evaluate to determine fruit and tree characters desired in a breeding program; and, (2) combine desirable qualities into disease resistant plums of high quality suitable for commercial and home production.

Hort. 565

Ill.

Inheritance and Breeding of Commercially Important Characters in the Peach. To (1) originate and introduce varieties with fruit bud hardiness maturing at closely spaced intervals throughout the season; and, (2) study manner of transmission of characters from parents to offspring.

Hort. 65-324

Miss.

Variety Testing and Breeding of Stone Fruits. To (1) determine, by testing, those varieties of peaches and plums which are best adapted to Mississippi growing conditions; and, (2) develop by breeding and selection new varieties of stone fruits, primarily plums and peaches, more suitable than varieties now available.

Hort. HK-1

N. J.

Peach Breeding. To (1) develop early ripening, large, yellow, freestone peaches; (2) develop freestone fruit that is disease resistant, hardy, large, productive, firm, attractive, good quality, and yellow fleshed, to ripen throughout the season, suitable for dessert fruit and for home and commercial processing; (3) develop clingstone varieties that are disease resistant, hardy, large, productive, good for canning and processing; (4) develop series of large, yellow fleshed, disease resistant, non-cracking, hardy, productive, good quality, freestone nectarines ripening throughout the season; (5) study mode of inheritance of horticulturally important characters; (6) develop methods of testing trees for disease resistance, particularly in seedling stage in greenhouse; (7) develop methods of producing seedlings from embryos of very early ripening peaches; (8) evaluate and use material available such as peento or saucer fruit shape, orange colored flesh, hardy trees, rootstocks, ornamentals, edible seeds, etc.; (9) maintain and assemble peach varieties and selections; and, (10) use promising mutant material from high energy irradiation of peach plant material under project 366.

Hort. 326 Coop. AEC

Tex.

Breeding and Rootstock Improvement of Peaches and Plums. To (1) develop and (2) test peaches having low chilling requirements, and plums adapted to Texas, with emphasis on early maturing plums; (3) learn influence of rootstocks on growth, blossoming, fruitfulness, and longevity of scion variety of plums and peaches; (4) collect native species of *Prunus* and grow to fruiting and use in breeding and rootstock programs; and, (5) learn satisfactory method of propagating different rootstocks.

Hort. 1034

Va.

Breeding New Varieties of Peaches and Nectarines Especially Adapted to Conditions in Virginia. To (1) test and distribute promising selections developed at station; (2) develop peaches having adaptability, handling and shipping qualities and all-around cultural qualities of Elberta; (3) study peaches having desirable character of tree and fruit mentioned, and ripening six or more weeks before Elberta to a week after; (4) varieties adapted for commerce and home; (5) peaches free from pubescence by continuation of breeding efforts; and, (6) genetic studies as an aid in hastening progress.

Hort. 86004

Varieties

- Ga. An Evaluation of Newly Introduced Selections and Varieties of Peaches. To evaluate newly introduced selections and varieties of peaches in order to keep peach growers informed as to their commercial possibilities.
Hort., Food Tech. 84
- Minn. Introduction, Preservation and Evaluation of Stone Fruits of Probable Potential Value to the North Central Region. To (1) maintain and enlarge an existing collection of stone fruits accumulated over the years at the Minnesota Station; (2) introduce and test for hardiness, productivity, fruit quality, etc., a large number of varieties, strains and species of stone fruits; (3) study potential value of these fruits for immediate culture or breeding work; and, (4) make available propagating material or propagated trees for further testing or use in other states or other regions.
Hort., Plant Path. 2221 Coop. USDA (NC-7)
- N. Mex. Peach Rootstocks and Stone Fruit Varieties. Learn (1) which rootstocks are best adapted for peaches in New Mexico; and, (2) the varieties of stone fruits best adapted.
Hort. 4

Culture

- Ark. A Study of the Factors Influencing Cold Injury to Peach Trees. To study environmental and physiological factors that influence susceptibility to cold damage in peach trees, giving special attention to factors that influence the initiation, intensity, and duration of rest period, in attempt to find a basis for development of techniques for modification or control of rest.
Hort. & For. 209
- Calif. Factors Influencing the Re-Establishment of Peach Orchards on Old Peach Soils. To discover and devise methods for preventing the peach replant growth depression.
Pomol. 1126
- Ga. The Causes of Premature Mortality of Peach Trees When Set on Land Previously Planted to Peaches. To find the cause of, and remedy for, the premature death of peach trees when set on land previously planted to peach trees.
Hort. 86

Ga. Nutrient Levels in Georgia Peach Orchards and the Development of Optimum Fertility Practices. To (1) survey representative peach orchards in State in order to study their nutrient element status in relation to yields obtained and past fertilizer practices of growers; (2) establish methods of foliar analysis of peach tree which will most accurately indicate its nutritional status and which are interrelated most closely with yield and quality of fruit; and, (3) establish optimum or critical levels of various nutrient elements in the foliage of the peach tree which are associated with optimum fruiting of the tree.
Hort., Chem., Soils 95

Miss. Peach Culture, Marketing and Variety Studies. To (1) determine influence of various peach orchard management practices on yield, grade, market quality and tree vigor; (2) study influence of cultural practices on market quality of different varieties; (3) evaluate adaptability of four varieties to commercial growing conditions in Pontotoc Ridge area; (4) study various practices of harvesting, packing, and transportation of fruit and their influence on quality; (5) analyse waste losses of firm-ripe, and green-mature fruit, and compare relative advantages and disadvantages of different types of containers; and, (6) evaluate market potential for Mississippi peaches sold under these various conditions.
Hort. HK-19

Miss. Peach Fertilization and Pruning. Study effects of N, P, and K fertilizers at three levels of pruning on tree growth, yield and quality of fruit of the peach.
Hort. HK-25

Miss. The Effects of Cultural Treatments Upon the Growth, Survival and Yield of Short Rest Period Varieties of Peaches. To (1) learn influence of various cultural practices on yield, grade, and quality of fruit and tree vigor of different varieties; (2) study influence of cultural and orchard management practices on longevity of different varieties; and, (3) evaluate adaptability of short rest period varieties of peaches grown in south Mississippi.
Hort. HY-1

Mo. The Culture of Stone Fruits in Missouri. To (1) Evaluate adaptability of recently introduced varieties for commercial and home production; (2) find dependable method of fruit thinning by application of sprays; (3) develop a system of soil management conducive to high production and quality under a continuous sod cover; (4) study pruning methods that will reduce hand operations to the minimum and that will secure strong highly productive trees adapted to mechanized culture; and, (5) learn value of disease-free, hardy and/or dwarfing rootstocks in production of stone fruits.

Hort. 126

Mont. Fertilizer Influences on Sweet Cherries. To determine (1) influences and places of commercial fertilizers in sweet cherry production; (2) ratio and level of nutrients and constituents affecting fruit set, time and evenness of maturity, and leaf area and fruit size and quality; and, (3) quantities present of main constituents as influenced by soil treatment and fertilizer applications.

Hort. M.S. 719

N. C. Study of Factors Influencing the Effect of Sub-Freezing Temperatures on Peach Tree Survival. To learn relationship between (1) rest period and hardiness; and, (2) hardiness and growth substances in tree.

Hort 87

N. C. The Effects of Cultural Practices and Supplemental Irrigation Upon Soil Properties and Orchard Performance Under Sand-Hills Conditions. To (1) investigate interactions between soil management practice and N fertilization and water supply as to effect upon vegetative and fruiting characteristics of peach tree survival and soil properties; and, (2) evaluate supplemental irrigation as it affects tree growth and performance, and N requirements.

Soils H-116

N. C. Soil Factors Affecting the Survival of Young Peach Trees Planted on the Sites of Old Orchards. To determine (1) role of various soil factors in failure of replanted orchards with a view to developing corrective measures; and, (2) relationship of certain nutritional conditions to winter hardiness of peach trees.

Agron., Soils H-117

Ohio

The Response of the Peach to Different Cultural Practices, and Rates of Nitrogen Fertilization as Indicated by Growth, Yield, Quality of Fruit, and Mineral Composition of the Foliage. To learn (1) systems of culture best adapted to establishment of peach orchards on old orchard sites; (2) effect of mulch upon nutritional status of tree with particular reference to fruit quality; (3) relation of nutrient content of foliage to quantity and quality of fruit produced; and, (4) practicability of rapid methods of determining soluble nutrient content of leaf tissue as guide for fertilizer recommendations for peach.

Hort. 21

Pa.

Cultural Practices and Fertilization of Tree Fruits. D. Montmorency Sour Cherry Fertilizer and Soil Management Study. To determine influence of two systems of soil management and various fertilizer applications in improving yield in a commercial planting of sour cherries.

Hort., Agron. 909-D

Pa.

Cultural Practices and Fertilization of Tree Fruits. F. The Relationship Between Sweet Cherries on Different Rootstocks Under Two Different Cultural Systems. To determine survival and productivity of two sweet cherry varieties on commercial Mazzard and Mahaleb rootstocks grown under two systems of soil management, Ladino clover sod and cultivation followed by ryegrass.

Hort., Agron. 909-F

Pa.

The Effects of Differential Fertilization on the Performance and Foliar Composition of Sour Cherry Trees. Learn probable correlation between foliar composition and performance of sour cherry trees subjected to differential fertilization with three levels of N, P, and K applied in all possible combinations.

Hort. 1267

R. I.

Cultural and Fertilization Practices for Tree Fruits. To (1) determine value of mulch materials in culture of tree fruits when compared with clean cultivation and sod; (2) study use of supplementary N with sod and mulch; and, (3) investigate foliar fertilization as a substitute for, or supplement to, ground fertilizer applications.

Hort. 503

S. C.

Chemical Thinning of Peaches. To (1) determine concentration and time of application of 3-Cl-IPC on young fruit of the peach to obtain commercial thinning; and, (2) test various chemicals and formulations of chemicals (growth regulators) to learn their usefulness as fruit thinning agents.

Hort. 62

- S. C. The Effect of Minor Elements and Irrigation on Peach Trees in the Sandhills of South Carolina. To determine the effect of (1) Fe, Mn, Zn, B, and Mg on the growth and yield of peach trees; and, (2) irrigation on the growth and yield of peach trees.
Hort., Agron. 63

Harvesting and Storage

- Calif. The Development of Improved Prune Harvesting Methods, and Their Effect Upon the Quality of the Fruit. To (1) study methods for separating fruit from the tree; (2) develop a machine for harvesting fruit off the ground; (3) study the use of catching frames; and, (4) learn effect of various harvesting methods on fruit quality.
Agr. Engin. 1717

Processing and Utilization

- Ohio Methods of Handling the Peach in Relation to Physiological Changes and Market Acceptance. To study effect of (1) harvest maturity on final dessert and processed quality of Hale Haven peaches; (2) storage temperatures at which fruits are held on their dessert and processed quality; and, (3) length of ripening at 70 to 75° after storage on fruit dessert and processed quality.
Hort. 50

Disease Control

- Colo. The Characterization of Strains of Peach Mosaic Virus and Changes Associated with the Host-Cell Metabolism of Infected Plants. To (1) isolate abnormal proteins associated with plants infected with different strains of peach mosaic virus; (2) characterize the strains of the isolated virus and try to establish their infectivity; and, (3) determine changes in host-cell metabolism and try to correlate changes with different strains of the virus.
Bot. & Pl. Path. 235 (W-22. See Part 17, Section c)
- Ga. Control of Peach Diseases. To (1) test materials and methods for obtaining better disease control combined with good color and finish on peaches; and, (2) cooperate with various agencies in this state and nearby states in the annual revisions of the peach spray schedule.
Pl. Path. 115

- Ill. Stone Fruit Virus Diseases and Their Control: Illinois.
To (1) purify and characterize peach X-disease virus and cherry necrotic ring-spot virus; (2) diagnose stone fruit virus diseases by serological, physical, or chemical methods; (3) learn insect vectors of peach X-disease virus; (4) ascertain rate of spread of cherry necrotic ring-spot virus under orchard conditions and evaluate effect of ring-spot disease on fruit quality and yield on tree growth; and, (5) detect presence and learn severity of stone fruit virus diseases in nurseries or orchards and their environs.
Hort., Plant Path. 68-372 (NC-14. See Part 17, Section c)
- Mich. Virus Diseases Affecting Peach and Maintenance of Virus-Free Standard Peach Varieties. To (1) develop methods and materials for indexing; (2) learn presence or absence of and identity of latent viruses in peach; (3) host range of peach viruses and symptom expression in different hosts; (4) separation and identification of virus entities present in peach in north central region and learn ability to incite disease singly and in combination; (5) economic importance of several diseases; (6) variability within viruses; (7) experimental transmission of viruses; (8) influence of environment on development and severity of diseases; (9) morphological, physiological and biochemical aspects of disease development; (10) chemical, and other methods of freeing plants and plant parts from virus infection and lessening injurious effects of viruses; and, (11) obtain and preserve elite sources of scions and rootstocks indexed as virus-free to be increased for experimental work and for commercial propagation of certified nursery stocks.
Plant Path.& Bot. 820 (NC-14. See Part 17, Section c)
- Minn. Stone Fruit Virus Diseases and Their Control. To (1) learn occurrence, distribution, severity and identification of viruses of hardy species of Prunus and hybrid varieties grown in Northern Great Plains; (2) learn effect of viruses on growth and yield of stone fruits; (3) study host range of viruses of Prunus; (4) study effect of environmental factors on expression of symptoms; (5) learn method of transmission and dissemination of viruses of hardy Prunus, especially in relation to insect vectors; (6) develop methods and materials for indexing viruses; and, (7) learn resistance or tolerance of Prunus species and varieties to viruses present or that might affect hardy species.
Plant Path.& Bot., Hort. 2223 (NC-14. See Part 17, Section c)

- Mo. Stone Fruit Virus Diseases and Their Control. To investigate new and different approaches to the problem of virus disease control including: continuation and extension of the indexing program; 2. fundamental studies of virus infection; 3. purification studies; and, 4. chemotherapeutic studies.
Hort. 68 (NC-14. See Part 17, Section c)

- Mo. Bacterial Spot, Brown Rot and Peach Scab Control and the Effect of Some of the Newer Pesticides Upon Fruit Finish of Peaches. To test promising synthetic organic fungicides as orchard sprays for effectiveness against brown rot, their phytotoxic effects and their value in control of peach scab; evaluating antibiotics which from in vitro tests have been found to be highly toxic to *Xanthanomas pruni*, for control of bacterial spot, and noting post harvest development of rots with different orchard fungicide programs.
Hort. 243

Insect Control

- Ark. Control of Plum Curculio by Reduced Schedules and Spot Applications. To control plum curculio by limiting insecticide applications to the time and place needed.
Ent. 272
- Pa. Biology and Control of Insect and Related Pests of Peach. To learn (1) life history of certain insects; and, (2) effectiveness of certain chemicals as control for pests of economic importance in peach orchards of state.
Zool.& Ent., Hort. 1255

Economics and Marketing

- Ark. The Maturity of Peaches in Relation to Handling and Consumer Acceptance. To determine (1) and set up guides for harvesting peaches at various stages of maturity; (2) carrying qualities of peaches at various stages of maturity, under various treatments, for various type containers, shipping methods and distance to market; and, (3) market and consumer acceptance for various stages of maturity and types of containers.
Hort. & For. 354
- S. C. Economics of Harvesting, Handling and Marketing Peaches in South Carolina. Learn amount of physical damage and the economic loss occurred at each step or function in harvesting, handling, and marketing of fresh peaches and test alternative methods which might be economically feasible and advisable.
Agr. Econ. 376

Tex.

Marketing Practices in Relation to New Varieties of Peaches. To (1) learn maturity indices for new varieties of Texas grown peaches; (2) learn best methods of handling fruit to reduce bruising from field through packing shed; (3) evaluate containers for packaging firm-ripe fruit; (4) learn best method of ripening firm-ripe peaches, storage, repacking and distribution; and, (5) learn consumer acceptance and demand of new Texas grown varieties of peaches.

Agr. Econ., Sociol., Hort. 1066

SUBTROPICAL FRUITS

Breeding

Hawaii

Improvement of Commercial Strains of Papaya (Carica Papaya L.). To (1) develop improved commercial strains of papaya for fresh fruit market and for processing by means of cross breeding, inbreeding, and selection; and, (2) learn genetics of tree and fruit characters as disease resistance, fruit size, shape, quality, firmness, color, and seed cavity size.

Hort. 173

P. R.

Coffee Breeding in Puerto Rico. To develop by selection and hybridization coffee varieties better adapted to the soil and climatic conditions of Puerto Rico and capable of regularly producing high yields of high-quality coffee; or more specifically, to (1) select within the Coffea arabica in the Island those trees which: a. produce regularly high yields of high quality coffee; and b. are exceptionally outstanding for one or more desirable characteristics; and, (2) to produce new coffee varieties through hybridization of selected varieties, and test them for adaptability to the region where coffee is or should be grown, for resistance to the attack of insects and diseases, and for quality of the coffee berries produced by them.

Plant Breeding, Plant Path., Ent. 74

Tex.

Citrus Breeding and Variety and Strain Evaluations. To (1) develop citrus fruits of improved quality, earliness, productivity, cold hardiness, and disease resistance; (2) free existing varieties of disease, and improve vigor and productivity by growing through necellar seedling stage; (3) collect and test variant strains of citrus for purposes of standardization and evaluation; and, (4) make quality studies of selected types for rating with respect to color, ascorbic acid content, Brix, glucosides, cloud index, juice percentage, and taste.

Hort. 683

Varieties

Hawaii

Introduction and Testing of Tropical Fruits and Nuts in Hawaii. To test newly introduced tropical fruits and nuts for possible value under Hawaiian conditions. New introductions will be planted and grown for observation and evaluation. They will include: miscellaneous tropical fruits and nuts, avocado and mango, citrus, lychee and longan, guava, and passion fruit. To these might be added the banana, strawberry and coffee.

Hort. 157

P. R.

Effect of Variety on Coffee Yields in Puerto Rico. To determine the highest yielder among the most promising coffee varieties of the Arabian group when planted at different levels.

Agron., Hort. 21 Coop. Federal Experiment Station, Mayaguez

Culture

Ariz.

Factors Affecting the Production of Citrus in Arizona. To study (1) rootstock effects and nursery management; (2) adaptation of new varieties and strains; (3) soil management in relation to nutrition; (4) nutritional and growth stimulating sprays; (5) citrus irrigation; and, (6) low temperature effects, surveys, grove heating.

Hort. 299 Coop. USDA

Ariz.

Response of Citrus Trees to Soil Moisture; Movement of Soil Moisture in the Root Zone. To learn (1) effect of soil moisture on tree growth and condition, fruit yield, size and quality, and most economical use of water, study factors associated with different levels of soil moisture which influence tree condition; (2) effect of moisture stresses in fall on fruit production and quality; and, (3) amount of water depletion from root zone which is caused by evaporation and percolation to lower depths.

Hort. 371 Coop. ARS

Ariz.

Protection of Citrus Trees and Fruit from Freezing Injury. Learn most efficient methods of operation and effectiveness of wind machines and orchard heaters in raising temperatures during freezes. Investigate physiological conditions of tree in relation to tolerance to cold.

Hort. 384 Coop. USDC-WB

- Ariz. Lemon Production Improvement in Arizona. (1) Soil moisture in relation to irrigation needs of lemon trees. (2) Nutritional needs of lemon trees in State. (3) Pruning needs of lemon trees in Arizona.
Hort. 405
- Calif. The Growth of Citrus and Other Crops as Affected by Minor Elements. To (1) develop methods of sufficient sensitivity for detection and estimation of Co, Cr, Ni, V, etc.; (2) investigate requirements of citrus and other crops for these and other elements and determine symptoms in deficiencies; (3) study toxic effects of various elements on crops; (4) study methods of application for essential minor elements and effects of treatment upon yield, growth, etc., of plants; and, (5) study effects of variation in supply of minor elements upon absorption of major essential elements.
Soils and Plant Nutr. 1025
- Calif. A Study of Citrus Orchard Soils with Special Reference to the Possible Deleterious Effect of Past Fertilizational and Cultural Practices. The points to be investigated are: The chemical, physical, and biological characteristics of citrus orchard soils in which yields, quality, and sizes are excellent in comparison with those in problem orchards; and the effects of various fertilizational and cultural practices on the chemical, physical, and biological characteristics of orchard soils.
Soils and Plant Nutr. 1188
- Calif. Plant Growth Regulators in Relation to the Physiology of Citrus. To (1) determine the manner in which mature fruit drop, increased fruit size, and increased storage life of citrus may be regulated by the use of plant hormones, investigating effects of plant growth regulators on photosynthesis, respiration, transpiration, translocation, cell elongation, etc.; (2) evaluate new or partially field-tested materials for their effects on functioning of plants, using lab and greenhouse techniques; and, (3) investigate possibility of extending use of plant growth regulators to control of other plant processes, using information developed under objective (1).
Plant Biochem. 1346
- Hawaii Coffee Yields and Grade as Influenced by Pruning and Cultural Methods. To (1) study economic increases in yield and quality, and reduction of harvesting costs in relation to those of pruning and fertilization; (2) gain preliminary evidence on new pruning systems; and, (3) new planting to be set out in 1949 in which new pruning systems will be initiated about 1953.
Hort. 166

Hawaii The Effect of Cultural Practices on the Growth and Fruiting of Papaya with Special Emphasis on the Maintenance of Production Under Continuous Cropping. To (1) learn if papayas can be grown on soil continuously or with short intercycles if there are suitable soil amendments, fumigation treatments, green manuring and mulching or combinations thereof; and, (2) investigate the fruit yield and quality of trees rehabilitated by dehorning and by side dressing with soil decontaminates.

Hort. 174.3

Hawaii Pruning and Training of Guava (Psidium Guajava) to Obtain Maximum Yield and Quality of Fruit. To (1) establish several systems of training such as open head, modified leader, and center leader, and learn advantages or disadvantages of each from standpoint of strength of tree and early bearing; (2) learn effects of several types of pruning such as heading back and thinning out on set and size of fruit, quality, and yield; (3) learn season and rate of application of fertilizers with respect to growth and yield in combination with pruning practices; and, (4) learn if wild guava stands can be thinned and renovated to produce commercial crops.

Hort. 179

Hawaii To Isolate and Test Dwarfing or Semi-Dwarfing Rootstocks for Mango. To (1) select varieties of seedlings possessing dwarfing or semi-dwarfing qualities for possible uses as rootstocks; (2) select varieties or seedlings possessing vigor and hardiness; (3) compare vigor and dwarfing effects of such stocks on own roots and when grafted upon other rootstocks; and, (4) compare growth and fruiting of such treatments.

Hort. 182.1

Hawaii A Physiological Study of Floral Initiation, Fruit Setting, and Fruit Maturation of Certain Subtropical Plants, with Special Reference to Growth Regulators, Photoperiod and Temperature. Learn (1) effects of growth regulators on formation of lychee fruits with aborted seeds and on preharvest drop of fruits; (2) influences of growth regulators on passion fruit development and preharvest drop; (3) physiological factors responsible for star-flower formation in coffee; and, (4) factors responsible for floral initiation in lychee and coffee: studies on critical photoperiod and influence of temperature primarily.

Plant Physiol. 655.1

Hawaii Nutritional Requirements of Coffee Growing on Lava Rock-land Soil. Learn (1) phosphate requirements of coffee grown in rock-land areas; (2) if there are any minor element requirements for high yields in rock-land areas; and, (3) importance of frequency of fertilizer applications, timing, and kind of carriers in promoting high yield in rock-land areas.

Plant Physiol. 659.1

Hawaii

Pollination, Fertilization and Post-Fertilization Requirements of Passion Fruit and Other Plants of Commercial Potential in Hawaii. To determine factors involved in pollination, fertilization and post-fertilization of passion fruit and other types of commercial potential, specifically to determine: (1) extent of self- and cross-compatibility; (2) factors responsible for self-sterility and differences in compatibility; and, (3) factors responsible for malformation of fruit.

Plant Physiol. 662

P. R.

Effect of Nutrient Applications on Coffee Yields in Puerto Rico. To determine the minimum nutrient applications necessary to maintain maximum yields of the most promising coffee varieties in Puerto Rico.

Hort., Agron. 20 Coop. Federal Experiment Station, Mayaguez

P. R.

Vegetative Propagation of Coffee. To (1) develop techniques whereby coffee plants can be easily and economically multiplied by cuttings and grafts; (2) extend range of soils and other environmental conditions under which coffee plants can be grown successfully; and, (3) make possible improvement of existing coffee seedling plantations by top-working old and inferior coffee plants.

Coffee Substa. 24

P. R.

Foliar Diagnosis for Pineapples. Learn relation between content of N, P, and K, or other essential elements in suitable tissues of pineapples and the "relative yields" of the pineapple represented by said plant tissue samples considering: (1) what part of plant is most suitable for reflection of nutrient deficiencies and yields; (2) when tissue samples must be taken to show nutrient-yield relationship and be in time to make adequate applications to crop to correct any deficiencies; (3) influence played by external factors in modifying nutrient content of plant, so corrections can be made to stabilize nutrient-yield equations; (4) influence variety and soil play in modifying nutrient content of plant, so adequate steps can be taken to formulate different nutrient-yield equations; and, (5) what mathematical equation best approximates relation between plant nutrient content and relative yields of said crop.

Agron., Hort. 116

P. R.

Natural Coffee Shading. Learn trees best suited for growing coffee under natural shade.

Plant Physiol. 122

Harvesting and Storage

Hawaii

Studies on Post-Harvest Physiology of Hawaiian-Grown Fruits, Vegetables and Ornamentals as Applied to Quality, Storage Life and Marketability. Investigate basic requirements of harvesting, transporting, handling, and storage necessary to assure high quality and marketability of various plant commodities from various areas.

Plant Physiol. 663

Processing and Utilization

Hawaii

The Drying of Coffee Beans. To (1) learn design requirements for driers capable of greater economies and efficiencies in processing and increasing coffee quality; and, (2) obtain data on thermodynamic properties of coffee while drying, and about mechanical techniques of drying coffee under various conditions of moisture content, temperature of drying air, rate of drying, bean ripeness, and humidity conditions.

Agr. Engin. 74.3

Disease Control

Calif.

Orange Tree Quick Decline: Rootstock Scion Relations Affecting Its Occurrence and Prevention. Methods to be used include determination of the susceptibility to quick decline of commercial citrus scions on various rootstocks, topworking to non-susceptible tops, inarching with resistant rootstocks, and rootstock identification in investigation of: (1) degree of susceptibility of various stock-scion combinations including sweet orange, lemons, grapefruit, and miscellaneous scion varieties on sour orange stock; (2) the effects of topworking susceptible sweet orange trees to other species of citrus including degree of response after topworking trees which are free of symptoms and those showing symptoms of various degrees; (3) the effects of substituting resistant rootstocks for susceptible sour orange roots on sweet orange trees by inarching; and, (4) identification of rootstocks.

Hort. 1382

Insect Control

P. R.

Control of Insects Attacking the West Indian Cherry, (Malpighia Punicifolia L.) in Puerto Rico. To (1) determine effectiveness of insecticides in control of insects of foliage and fruit of West Indian cherry; (2) make life-history studies of most important insect pests; and, (3) find out best spraying program for insect control.

Ent. 71

P. R. Control of Coffee Insect Pests. To determine (1) most effective and economic insecticides for control of coffee leaf miner Leucoptera coffeella Guerin-Menneville and the hormiguilla Myrmelachista ambigua var ramulorum Wheeler; and, (2) best spraying schedule, rates, and methods for application of insecticides which prove to be of value in control of the leaf miner and hormiguilla.

Ent., Plant Physiol. 72 Coop. ARS

Economics and Marketing

Fla. Factors Affecting Costs and Returns in Florida Citrus. To learn effects of grove practices, such as fertilization, irrigation, cultural, and spray on grove costs, returns, yields, and profits; as classified by rootstocks, soils, and varieties, and how efficient practices may be implemented.

Agr. Econ. 186

Hawaii Farm Cost of Production and Efficiency Studies on Certain Specific Horticultural Crops Including Coffee and Passion Fruit. To (1) ascertain production costs for selected horticultural crops; and, (2) further analyze these costs with objective of increasing production efficiency.

Agr. Econ. 361.1

P. R. Shipping and Export Tests with Avocados. To determine (1) which of over 50 varieties and selected clones now considered highly promising are best for export purposes; and, (2) most profitable shipping period and to develop maturity standards and packing and shipping techniques with the view of fostering establishment of an avocado export industry.

Agron. 58

NUTS

Breeding

N. Mex. Breeding Pecans for New Mexico Conditions and Determining Adapted Varieties. To (1) develop one or more varieties of pecans of early maturity and high resistance to aphid injury, tolerant to moderate Zn deficiency, and otherwise adapted to climate and soils of southern New Mexico; and which combine the nut characteristics of the best commercial varieties; and, (2) grow and test certain varieties of out-of-state origin to learn their adaptation and commercial value for New Mexico.

Hort. 18

Varieties

- Hawaii Variety Selection and Testing of the Macadamia Nut (Macadamia Ternifolia and M. Tetraphylla Johnson). To develop improved commercial varieties of the macadamia nut through selection and variety testing.
Hort. 175
- La. Comparative Trial on Tung Tree Size, Growth Habits, and Yield and Percentage Oil in the Whole Fruit of Selected Mother Trees Propagated by Different Methods. Obtain further information on behavior of budded and first- and second-generation seedlings propagated from six mother trees chosen as best available at time of setting up the experiment and the comparative merits of budded trees propagated from three mother trees, the seedlings of which are not sufficiently uniform to warrant use.
Hort. 391
- N. Mex. Pecan Rootstocks and Orchard Planting Methods. To (1) develop more reliable and efficient methods for pecan orchard planting and establishment under climatic and cultural conditions of State; and, (2) test and evaluate certain new hybrid varieties of pecans as rootstocks for budded varieties.
Hort. 72

Culture

- Ariz. Factors Affecting the Production of Pecans in Arizona. To learn (1) soil moisture and salinity in relation to irrigation requirements; and, (2) nutritional requirements of pecan trees in Arizona.
Hort. 398 Coop. ARS
- Fla. Fertilization of Pecans. Learn effects of differential fertilization with N, K, and other mineral elements on yield and nut quality.
Fruit Crops, Soils 565
- Okla. Investigations on the Causes and Control of Erratic Bearing of the Pecan. To (1) learn causes for erratic bearing; and, (2) devise a method to correct or avoid this.
Hort. 985

Harvesting and Storage

No research projects under this classification at the time this report was compiled.

Processing and Utilization

- Ga. Study of the Marketing Quality of Pecans and Pecan Products. To learn (1) influence of conditions in orchard on marketing quality of pecans; (2) influence of methods of shelling pecans on quality of pecan products; (3) effect of chemical composition of pecans on stability of pecans and pecan products and effect of adding antioxidants, hydrogenated fats, lecithin, etc.; and, (4) influence of methods of packaging shelled and unshelled pecans on stability of pecan products.

Hort. M-77 Coop. ARS

Disease Control

- Tex. Foliage Diseases of Pecans and Their Control. To develop (1) an effective spray or dust program for the control of prevalent foliage diseases of the pecan; and, (2) test fungicides that will be compatible with commonly used insecticides and which will not result in increased insect populations.

Plant Physiol. and Path., Ent. 736

Insect Control

- Miss. Insecticide Tests for the Control of the Hickory Shuck-Worm *Laspeyresia caryana* (Fitch) on Pecans. To test the effectiveness of EPN for the control of the hickory shuckworm under Mississippi conditions.

Ent. HH-11

Economics and Marketing

- Okla. Marketing Pecans in Oklahoma. To (1) describe and analyze trends in economic variables affecting pecan industry and interpret trends in terms of their probable impact on State industry over various periods; (2) by statistical procedure, measure the major factors affecting demand for Oklahoma pecans and interrelations thereof; (3) learn present marketing organizations, facilities, methods and practices used in moving pecans from producer to retail consumer; (4) make preliminary investigation of feasibility and desirability of making a detailed cost and efficiency study of pecan shelling plants; and, (5) analyze effects of specific modifications in present marketing organization, facilities, methods or practices in terms of marketing efficiency, market outlets and market stability, and returns to growers.

Agr. Econ. 977

Tex.

Consumer Demand for and Development of Improved Grades and Standards for Pecans. To (1) learn variation in price-quality and grade relationship for in-shell pecans as sold under current marketing practices in retail stores; (2) develop improved, or new, standards and grades designed to eliminate consumer uncertainty as to quality of pecans purchased on in-shell basis, improve returns to growers in relation to quality of pecans produced, and improve marketing practices; and, (3) measure consumer demand and preference for in-shell pecans sold on improved grade basis in retail stores compared to previous methods of selling and in relation to pecans sold on shelled basis.

Agr. Econ., Home Econ., Hort. ES 378

REGIONAL PROJECTS

NC-7

The Introduction, Multiplication, Preservation and Evaluation of New Plants for Industrial and Agricultural Use.
To (1) cooperate in a coordinated program of foreign and domestic plant exploration and introduction to obtain plant materials and to determine their potential value for agricultural, industrial and other uses; (2) multiply, evaluate and maintain introduced materials adapted to the ecological conditions of the North Central Region through the operation of a Regional Plant Introduction Station and through arrangements between the regional station and state experiment stations when advisable; (3) distribute introduced plant materials of possible value within the North Central Region and to maintain records of their use in the region; (4) maintain and preserve the germplasm of field, and horticultural crops and woody plants of potential value to the states in the region; (5) coordinate the program of introduction, multiplication, distribution, evaluation and preservation in the North Central Region with similar programs in the other regions; and, (6) encourage and stimulate the research workers of the North Central Region in the evaluation and use of new introductions in crop improvement programs.

Cooperating Stations and Agencies: Federal-grant projects- Nebr., S. Dak., I-B; Ohio, II-B; Alaska, III-A; Minn., IV-B; ARS, USDA

NE-9

Discovery and Preservation of Valuable Plant Germ Plasm.
To (1) cooperate in a program of foreign and domestic plant exploration and introduction; (2) grow new plant introductions and determine their potential values for agricultural and industrial use and to accumulate and maintain records of the merits and performance of plant introductions tested at the Regional Station and at the 14 Experiment Stations of the Northeast Region; (3) propagate new plant introductions so that they may be distributed to interested plant breeders, geneticists, and other crop improvers; (4) maintain and preserve germ plasm of agronomic, horticultural, and woody plants of potential value to agriculture; (5) coordinate the Northeast program with that of the other three regions and with the programs of inter-regional stations; and, (6) assist the researchers of the region in the evaluation and use of plant introductions.

Cooperating Station: Federal-grant project- Pa., III-A

S-9

The Introduction, Multiplication and Evaluation of New Plants for Industrial and Agricultural Use and the Preservation of Valuable Germ Plasm. To (1) cooperate in a coordinated program of foreign and domestic plant exploration and introduction; (2) multiply, evaluate and maintain introduced materials adapted to the southern region through the operation of a primary regional plant introduction station with adequate personnel and facilities for such work and through contracts between the primary station and state experiment stations when advisable; (3) catalogue and distribute introduced plant materials of possible value within the region and to maintain records of their use in the region; (4) maintain and preserve germ plasm of field and horticultural crops of economic value; and, (5) coordinate the programs of introduction, multiplication, evaluation, and preservation in the southern region with similar programs in the other regions.

W-6

The Introduction, Multiplication, Preservation, and Determination of Potential Value of New Plants for Industrial and other Purposes and for the Preservation of Valuable Germ Plasm of Economic Plants. To (1) cooperate in a coordinated program of plant explorations, both foreign and domestic, to obtain plant materials and to determine their potential value for industrial and other purposes; (2) establish and maintain a Regional Plant Introduction Station with adequate facilities and personnel to handle introduced and domestic seed and plant materials adapted to the ecological conditions of the Western Region and to establish secondary stations if desired; (3) initiate a program of cataloging, preserving, multiplying, distributing and reporting performance of introduced and domestic seed and plant materials of potential value within the region; (4) maintain and preserve the germ plasm of field and horticultural plants of economic value to the states in the region; and, (5) establish suitable methods for coordinating the program in the Western Region with programs in other regions to avoid unnecessary duplication.

Cooperating Station and Agency: Federal-grant project-Oreg., II-A;

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8:		
Part :	Subject-Matter Area	Title of Section
Numbers :		
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Com- modities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Develop- ment b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Micro- biology, Sanitation & Public Health b. Food Engineering, Processing, Product and Process Develop- ment, Utilization and Waste Disposal c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8:

Part :	Subject-Matter Area	Title of Section
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Numbers :

12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classification
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control

